

**DRAFT FINAL CONSTRUCTION QUALITY ASSURANCE PLAN**

**SOURCE AREA 7 REMEDIAL DESIGN**

**SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION SUPERFUND  
SITE**

**October 2012**

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# **Section 1**

## **Introduction**

This Draft Final Construction Quality Assurance Plan (CQAP) describes the methods and procedures that will be implemented by the Contractor and CDM Smith Inc. (CDM Smith) to ensure that the work addressed in the signed and sealed 100% Remedial Design (RD) completed by CDM Smith in October 2012 at Source Area 7 (Area 7) of the Southeast Rockford Groundwater Contamination Superfund (SERGC) site is constructed in accordance with the design requirements. The scope of work for this Remedial Action (RA) includes the design, construction, and installation of a remediation system for the extraction and treatment of contaminated groundwater and soil gas to address soil and groundwater contaminated with volatile organic compounds (VOC) at Area 7. This work also includes the construction of the building to house the treatment system, which will eventually serve as a recreational and/or maintenance facility for the Rockford Park District.

Quality assurance (QA), as used in the context of this CQAP, refers to planned and systematic actions that are implemented by the Contractor and CDM Smith to ensure that construction work is completed in accordance with design requirements and applicable standards for materials, equipment, and workmanship. This includes: 1) establishment of a construction quality control (QC) program and 2) implementation and continued evaluation of the program through the performance of inspections, verifications, and audits using established means to control and measure the quality of products and workmanship. QC also includes the implementation of corrective measures, when necessary to ensure proper completion of work.

As the Illinois Environmental Protection Agency's (Illinois EPA) RA Oversight (RAO) Contractor, CDM Smith serves as the Illinois EPA's engineering representative, and is responsible for the overall construction QA and ensuring the goals of the RA are met.

The construction work will be completed by the Illinois EPA's construction contractors (Contractor). At the time of writing this draft final CQAP, the Contractors have not been selected. The intent is that the treatment building and construction of the leachate treatment system will be constructed by two separate contractors; a "Building Contractor" and a "Process Contractor", respectively. The delineation of work between the two contractors is provided in the Design Drawings and Contract Documents. The methods and procedures described in this CQAP are generally applicable to both the Building Contractor and the Process Contractor; therefore, the term "Contractor" in this document is inclusive of both the Building Contractor and the Process Contractor, unless otherwise noted.

This CQAP was prepared in accordance with the U.S. Environmental Protection Agency (U.S EPA) guidance document "Construction Quality Assurance for

Hazardous Waste Land Disposal Facilities” (October 1986). As per the guidance, this CQAP addresses five primary elements of construction QA:

- Responsibility and authority for all key personnel involved in the RA;
- Personnel qualifications and certifications;
- Inspection and certification of the work;
- Sampling requirements for construction related activities; and
- Documentation

The first two elements are discussed in Sections 2.0 and 3.0. The remaining elements are covered in Sections 4.0 through 7.0.

This CQAP does not address QA/QC for environmental/chemical sampling and analysis, which is included under the Quality Assurance Project Plan (QAPP) included with the overall Area 7 RD package. This CQAP will be finalized by the Process and Building Contractors for their respective work. The QAPP will be finalized by the Process Contractor.

## Section 2

# Construction Quality Assurance Organization

### 2.1 Purpose

The purpose of this section is to define the primary roles and responsibilities of key personnel from each party involved with implementing the construction QA program.

### 2.2 Roles and Responsibilities

The primary roles and responsibilities of key personnel from each party involved with the construction are summarized below. The Project Organization Chart, which illustrates the lines of authority and communication between parties, will be included as Figure 2-1 when this CQAP is finalized.

#### 2.2.1 Illinois EPA's Responsibilities

The Illinois EPA has ultimate responsibility and authority for all aspects of its implementation. Illinois EPA personnel and their responsibilities are shown below.

Role	Contact	Responsibilities
Project Manager	Doyle Wilson	Responsible for day-to-day technical and financial management of this project. Primary Illinois EPA contact for all aspects of work. Monitors the project for conformance with scope and budget contained in the Contract documents. The Project Manager also serves as the liaison to the U.S. EPA and various groups within the Illinois EPA including Community Relations.
Agency Purchasing Officer	Arthur Moore	Responsible for overall contractual management of this project. Monitors the project for conformance with the signed contract clauses, budget contained in the approved scope of work and the terms and conditions. Has consent authority for all changes in scope and cost.

#### 2.2.2 CDM Smith's Responsibilities

CDM Smith is Illinois EPA's RAO Contractor for this work assignment. CDM Smith serves as the Illinois EPA's engineering representative and is responsible for overall construction QA and ensuring the RA is successfully completed as specified in the RD

Contract documents. CDM Smith personnel and their responsibilities are shown below:

<b>Role</b>	<b>Contact</b>	<b>Responsibilities</b>	<b>Qualifications</b>
Site Manager	John Grabs, P.G.	Responsible for day-to-day project management. Primary CDM Smith contact for all aspects of work.	P.G. Geology; 23 years of experience
Contract Administrator	Leah Serra	Responsible for overall management of the RA Contract.	A.A. Business Administration; 6 years of experience
Project/Resident Engineer	Brandon Celaya, P.E.	Responsible for coordinating and/or performing all engineering and resident engineering tasks and tracking work status, schedule, cost on a daily basis under the direction/supervision of the Site Manager.	P.E Engineering; B.S. in Civil Engineering, M.S. in Civil Engineering; 7 years of experience
Resident Engineer Representative	TBD	Responsible for performing resident engineering tasks during construction under the direction and supervision of the Resident Engineer. Responsible for overseeing construction QC testing.	
QA Coordinator	Wendy Dewar	Responsible for overseeing QA/QC on this project. Coordinates with the Project/Resident Engineer regarding the status of construction QA/QC activities. Coordinates and/or performs QA field audits. Verifies that all Illinois EPA and CDM Smith QA requirements are met.	B.S. Chemical Engineering, 27 years of experience



Role	Contact	Responsibilities	Qualifications
Safety Manager	Christopher Marlowe, CIH, CSP	Responsible for managing and monitoring CDM Smith's health and safety program at the corporate level. Coordinates with the Health and Safety Coordinator to ensure project conformance with CDM Smith health and safety requirements.	Certified Industrial Hygienist; Certified Safety Professional; B.S. Chemistry; M.S. Environmental Engineering; 28 years of experience
Health and Safety Coordinator	TBD	Responsible for overseeing health and safety on this project. Coordinates with the Project/Resident Engineer regarding the status of construction health and safety activities. Verifies that all Illinois EPA and CDM Smith health and safety requirements are met.	

CDM Smith's Site Manager, QA Coordinator, Project/Resident Engineer, and Resident Engineer Representatives are the primary personnel involved with construction QA. All assigned personnel must at a minimum possess general corporate technical knowledge of all aspects of the project, and must successfully execute the construction QA program on all aspects of the project. Individuals possessing experience in specialized areas will be added to the organization as required during construction. The QA Coordinator is responsible for overseeing the construction QA program for both the building and treatment process and will coordinate with the Project/Resident Engineer regarding the status of construction QA/QC activities. The Project/Resident Engineer in conjunction with the QA Coordinator will have the following responsibilities during construction:

- Ensure that appropriate technical review is completed by qualified representatives for construction plans, specifications and drawings, and any modifications to the drawings or specifications;
- Review all design documentation, including the design drawings and specifications and modifications as they occur during construction;
- Provide assistance in determining that the construction has been completed in general conformance with the drawings and specifications;

- Maintain contact with the Site Manager and Contractor regarding conformance with the QA/QC requirements;
- Provide assistance to the Resident Engineer Representative in the review and interpretation of field and laboratory testing results;
- Review of shop drawings and other submittals from the Contractor and all lower-tier subcontractors;
- Review all field and laboratory QC testing results for conformance with the specifications. Provide an interpretation of data to determine areas that are in conformance and in non-conformance with these documents. Determine areas which require reworking and/or repair;
- Perform periodic site visits to review construction progress and QA/QC procedures; and
- Ensure that the Resident Engineer Representative is notified of any noted deficiencies in QA/QC testing results or procedures.

The Resident Engineer Representative is the primary onsite contact during construction that implements the construction QA program along with the Contractor personnel. Among other duties, the Resident Engineer is responsible for the following tasks regarding QA:

- Record any onsite activities that could result in non-compliance with the design documents and report these activities to the Project/Resident Engineer;
- Document field and laboratory testing as required by the specifications;
- Observe construction materials, such as soils and piping, delivered to the Site to determine general conformance with material specifications;
- Observe and record procedures used for Site preparation, construction of the treatment facilities and structures, and any deficiencies in these activities;
- Make note of all construction activities using a logbook; and
- Maintain a continuous record of any changes or modifications to the design drawings and specifications.

### **2.2.3 Illinois EPA's Building Contractor**

The Illinois EPA's Building Contractor is responsible for completing construction of the building and associated systems that are directly related to only the building to house the treatment system in accordance with the Contract documents under Illinois EPA's direction and CDM Smith's supervision. The Building Contractor will be

procured by Illinois EPA and has therefore not yet been determined. **It will be the responsibility of the Building Contractor to finalize this section with a detailed description of the organizational structure and personnel specific to the construction activities for this RA.** At a minimum, this must include:

- Key personnel, including, but not limited to:
- Project Manager;
- Site Supervisor;
- QA Officer;
- Health & Safety Officer; and
- Site Health & Safety Coordinator.
- Responsibilities for each person; and
- Qualifications for each person.

#### **2.2.4 Illinois EPA's Process Contractor**

The Illinois EPA's Process Contractor is responsible for completing design, construction, and installation of the contaminated media extraction and treatment system in accordance with the Contract documents under Illinois EPA's direction and CDM Smith's supervision. The Illinois EPA Process Contractor is currently being procured by Illinois EPA and has therefore not yet been determined. **It will be the responsibility of the Building Contractor to finalize this section with a detailed description of the organizational structure and personnel specific to the construction activities for this RA.** At a minimum, this must include:

- Key personnel, including, but not limited to:
- Project Manager;
- Site Supervisor/Superintendent;
- QA Officer;
- Health & Safety Officer; and
- Site Health & Safety Coordinator.
- Responsibilities for each person; and
- Qualifications for each person.

## **Section 3**

# **Overview of the Construction Quality Assurance/Quality Control Process**

### **3.1 Purpose**

The purpose of this Section is to provide an overview of the construction QA/QC process, which generally includes three phases: 1) preparatory, 2) initial, and 3) follow-up. These construction QA/QC phases are intended to ensure that all aspects of the work are completed in accordance with the Contract requirements and applicable standards for materials, equipment, and workmanship for construction of the building and the treatment process. The scope and results of all activities completed during these phases of QA/QC inspections will be documented by the Project/Resident Engineer, as described in Section 4.0. This Section shall be finalized by the Building Contractor and Process Contractor prior to the start of construction.

### **3.2 Definable Features of Work**

A definable feature of work (DFW) is defined as follows:

- A definable feature of work is an activity that is separate and distinct from other activities, has separate control requirements, and may be identified by different trades or disciplines. It may also correspond to work performed by the same trade, but in a different environment. The various divisions of the Contract specifications identify the definable features.

The DFW's for the Site will be determined by each Contractor, which may include, but are not limited to:

- Clearing and grubbing;
- Groundwater extraction well installation;
- Multiphase extraction (MPE) well installation;
- Yard piping trenching and installation;
- Environmental sampling;
- Groundwater treatment building construction;
- Leachate treatment system equipment installation;
- Rough-in of electrical boxes and wiring methods;

- Lighting fixtures, receptacles, and accessories;
- Panelboards, circuit breakers and motor control centers;
- Power supply;
- Water supply piping, fittings and supports;
- Start-up and performance testing;
- Wastewater/groundwater sampling;
- Concrete reinforcement and formwork;
- Concrete mixing, placement, curing and finishing;
- Chemical data acquisition;
- Operation and maintenance;
- Site restoration;
- Civil surveying;
- Decontamination of personnel, tools and equipment; and
- Mobilization and demobilization.

### **3.2.1 Building DFWs**

The Building Contractor shall provide their DFWs in this Section.

### **3.2.2 Process DFWs**

The Process Contractor shall provide their DFWs in this Section.

## **3.3 Three Phases of Construction Quality Control**

### **3.3.1 Preparatory Phase**

This phase is conducted by the Project/Resident Engineer or Resident Engineer Representative, along with the Contractor's site superintendent, for a given definable feature of work after all of the associated construction submittals have been approved. A meeting is scheduled in advance of the work activity to ensure that there is sufficient time for any necessary corrections.

This phase includes the following activities:

- Review the applicable specification sections;

- Review the applicable drawings;
- Verify that all associated materials and equipment have been approved (as per the submittals) and field inspected for conformance with submittals;
- Review any testing requirements to ensure that the necessary provisions have been made to complete such testing;
- Verify that all required permits and licenses have been obtained and that all required notifications have been made;
- Examine the work area to ensure that all required preparatory work has been completed;
- Review the applicable sections of the health and safety plan, and jointly develop an activity hazard analysis to ensure that the applicable safety requirements will be met; and
- Discuss the standards of quality that apply to the work to be performed, along with the construction methods and approach to be used to complete construction, and identify any potential problems in meeting quality standards.

### **3.3.2 Initial Phase**

The initial phase is to be conducted by the Resident Engineer or Resident Engineer Representative, along with the Contractor's site superintendent when the Contractor is ready to start the work for any given definable feature of work. At any given time during the course of work, the Contractor's superintendent should be able to explain the scope of work in progress, as well as the applicable QA/QC requirements for its completion.

This phase includes the following activities:

- Inspect the work in progress for compliance with the Contract requirements and agreements made during the preparatory meeting;
- Verify that the Contractor's quality controls are adequate to ensure compliance with the Contract requirements, including inspection and testing;
- Resolve any problems or conflicts that may affect the quality of work;
- Review the hazard analysis to ensure that it fully defines the work being performed;
- Verify that all required personal protective equipment (PPE) is being used and monitoring is being performed; and

- Verify that the workmanship meets applicable requirements and standards.

The initial phase will be repeated for each new crew assigned by the Contractor, and at any time when the Resident Engineer or Resident Engineer Representative determines that the required construction QA/QC requirements and standards are not being met.

### **3.3.3 Follow-Up Phase**

This phase is conducted by the Resident Engineer or Resident Engineer Representative, along with the Contractor's site superintendent, at minimum, on a daily basis until each definable feature of work is complete.

This phase includes the following activities:

- Verify that the work has been completed in accordance with the Contract requirements and applicable standards;
- Verify that all required field tests were properly completed and that acceptable results were obtained;
- Identify and track any non-conforming work items; and
- Track resolution of deficiency work items and clear such items from the deficiency tracking log after correction

The QA Coordinator will monitor this on a continuous basis.

## Section 4

# Construction Quality Assurance/Quality Control Activities

### 4.1 Purpose

The purpose of this section is to present the project-specific construction QA/QC activities to be completed by CDM Smith and the Contractor on a routine basis during implementation of the Area 7 RA.

The Contract documents play an important role in the implementation and monitoring of QA/QC activities. The contents of these documents establish QA/QC elements of activities occurring before, during, and after the construction. Specific to QA/QC, the specifications may, depending on the given component of construction, specify any or all of the following:

- Manufacturer and model number for specific equipment;
- Performance standards or operating conditions to assist the Contractor in the selection and purchase of equipment;
- Required construction materials;
- Applicable codes, standards, and specifications to govern material and workmanship quality;
- Information to be submitted for technical review;
- Coordination of work activities for all elements of construction;
- Manufacturer or field testing requirements;
- Performance guarantees; and
- Workmanship/equipment warranties.

Fulfillment of the specifications provides the framework for QA/QC measures by identifying the appropriate equipment and materials to be utilized, indicating acceptable construction practices, requiring on and off-site testing, and specifying performance and workmanship warranties. To gauge compliance with the requirements of the Contract documents, QA/QC activities are performed such as the review of technical submittals and material/equipment testing and inspection. The following activities are further discussed below. **This Section shall be finalized by the Building Contractor and Process Contractor prior to the start of construction.**



## **4.2 Review of Technical Submittals**

### **4.2.1 Task Description**

For certain elements of construction, the Contract specifications require that the Contractor prepare and submit various technical data to CDM Smith for review. The purpose of the submittals is to: 1) obtain detailed information regarding how the Contractor intends to complete the work and 2) verify that the intended work conforms to Contract requirements and intent.

Technical data submittals, which are commonly referred to as “shop drawing” submittals, are required for many elements of construction. Required submittals generally include, without limitation, detailed project plans, material samples, manufacturer's product specifications and literature, testing data, engineering calculations, detailed engineering drawings (e.g., site/civil, mechanical, electrical, process and instrumentation), operations and maintenance instructions, certifications, warranties, and as-built documentation. Some submittals are subject to review and approval by CDM Smith for conformance to the Contract requirements and intent; others are provided for informational purposes only.

Shop drawing review is an essential part of the construction QA process, which begins upon Illinois EPA's issuance of the Notice to Proceed (NTP) and continues through final completion of construction. The Contractor's shop drawings must contain all quantities, dimensions, field construction criteria, materials, model numbers, and other information pertinent to definable features of work, as required by the Contract specifications. Submittals subject to review by CDM Smith must be approved in writing, before the Contractor initiates any work or construction for an associated definable feature of work.

The Contractor submittal will be distributed by the Project/Resident Engineer to appropriate design engineers and technical specialists for review. The reviewers must work closely with the Project/Resident Engineer on those submittals that are borderline between approval and disapproval. If there is any doubt as to the degree of review, or the appropriate review code, the reviewer should discuss the matter with the Project/Resident Engineer, or appropriate members of the design team.

The Contractor will be required to submit a submittal schedule for major submittal packages in advance so CDM Smith's reviewers will be available to complete the submittal reviews in a timely and comprehensive manner.

### **4.2.2 Procedures for Task Completion**

The following general procedures will be used for completing reviews of technical submittals:

- Contractor submittals will be received by the Project/Resident Engineer, who shall record their receipt in the submittal log;

- The Project/Resident Engineer will notify the Site Manager regarding receipt of transmittals;
- The Project/Resident Engineer will review submittals and/or coordinate such reviews by appropriate design engineers and technical specialists;
- The results of submittal reviews shall be documented and transmitted to the Contractor in writing (see below), and recorded in the submittal log by the Project/Resident Engineer;
- The Project/Resident Engineer will update the Site Manager and Resident Engineer Representative regarding the status of submittal reviews, and provide notification when the submittal requirements have been met for a definable feature of work;
- The Project/Resident Engineer will maintain copies of all submittals in the office project files, and send copies of all approved submittals to the Resident Engineer Representative for inclusion in the field project files; and
- The Project/Resident Engineer will transmit copies of approved submittals to the Illinois EPA PM for documentation purposes.

The Project/Resident Engineer will convey the results of submittal reviews to the Contractor by completing a transmittal form (see Appendix B) and attaching the subject submittal with any associated corrections/markups. The form will be signed by the Project/Resident Engineer and Site Manager, and indicate one of the following results:

- **Code 1 - "APPROVED"** - This code is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
- **Code 2 - "APPROVED AS NOTED"** - This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
- **Code 3 - "APPROVED AS NOTED/CONFIRM"** - This combination of codes is assigned when a confirmation of the notations and comments is required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. The confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by CDM Smith within 10 calendar days of the date of the CDM Smith's transmittal requiring the confirmation.

- **Code 4 – “APPROVED AS NOTED/RESUBMIT”** – This combination of codes is assigned when notations and comments are extensive enough to require a re-submittal of the package. This resubmittal is to address all comments, omissions, and nonconforming items that were noted. Resubmittal is to be received by CDM Smith within 10 calendar days of the date of the CDM Smith’s transmittal requiring the resubmittal.
- **Code 5 – “NOT APPROVED”** – This code is assigned when the submittal does not meet the intent of the contract documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the Contract Documents.
- **Code 6 – “COMMENTS ATTACHED”** – This code is assigned where there are comments attached to the returned submittal, which provide additional data to aid the Contractor.
- **Code 7 – “RECEIPT ACKNOWLEDGED (Not subject to Review or Approval)”** – This code is assigned to acknowledge receipt of a submittal that is not subject to review and approval, and is being filed for informational purposes only. This code is generally used in acknowledging receipt of means and methods of construction work plans, field conformance test reports, and health and safety plans.

## **4.3 Field Inspection and Testing of Materials, Equipment, and Workmanship**

### **4.3.1 Shop Inspection and Testing**

#### **4.3.1.1 Task Description**

The Contract specifications require that all components of the leachate treatment system be shop tested. The Contractor will test the system components at the factory and certify that the system components have been designed and constructed to conform with the Specifications. All piping and pressure vessels shall be hydrostatically tested at 150% of their maximum operating pressure for a minimum of one hour. The testing shall be of sufficient complexity and duration to fully demonstrate the operability of all equipment and systems with respect to functionality, rate, and capacity over the specified operating ranges of the equipment provided. The Contractor will be responsible for repairing all leaks and retesting as necessary to the satisfaction of the Illinois EPA and CDM Smith.

In accordance with Specification Section 13300, Process Instrumentation and Control equipment will be tested at the factory prior to shipment to the site. The Contractor and designated Process Control System Integrator (PCSI) will ensure that all equipment provided by the PCSI is tested at the factory as a single fully integrated system, unless otherwise specified in the individual Specification sections. Wherever

possible, tests will be performed using actual process variables, equipment, and data. As a minimum, factory testing will include the following:

- Unwitnessed Factory Test;
- Operational Readiness Test; and
- Functional Demonstration Test.

In accordance with Specification 01171, each motor shall be given an unwitnessed routine short commercial test per NEMA MG1 and IEEE 112 at the factory.

All factory and shop tests will be conducted in accordance with prior approved procedures, forms, and checklists. All tests will be signed off by the appropriate parties, and copies of the sign-off forms will constitute the test documentation.

## **4.3.2 Field Inspection and Testing**

### **4.3.2.1 Task Description**

The Contract specifications include inspection and testing requirements for materials, equipment, and workmanship, which must be met upon delivery or installation at the site by the Contractor. The intent of these requirements is to ensure that: 1) all construction work is executed in accordance with the Contract documents and approved shop drawings and 2) all materials, equipment, and workmanship are free of defects. Inspections will be performed by the Resident Engineer Representatives on a routine basis, from material/equipment delivery until final installation, to verify that such items meet the specifications and are properly installed. The three phases of construction QA/QC described in Section 3.3 will be implemented as part of this task.

### **4.3.2.2 Procedures for Task Completion**

As per the Contract specifications, the following types of inspections and tests will be performed, without limitation, to verify that construction is completed in accordance with the Contract specifications:

- Inspection of all materials and equipment upon delivery and prior to installation for defects and for conformance with the specifications and approval of shop drawings;
- Inspection of field activities/installation for compliance with Contract Drawings and Specifications;
- Sampling and analysis of the leachate treatment system in accordance with the site QAPP;
- Hydraulic testing and inspection of yard pipe for leakage following placement, but prior to backfill;

- Compaction testing of backfilled areas;
- Field running tests of submersible pumps;
- Slump testing of concrete upon delivery;
- Compressive strength testing of concrete;
- Sieve analysis/certified soils laboratory report for all imported granular materials/aggregate;
- Mill test certificates for steel reinforcement;
- Inspection and approval of the incoming electrical, water, and telephone service by the respective utility companies and local inspection agencies with certificate of inspections to be provided;
- Field tests of all miscellaneous electrical controls;
- Testing of all yard wire and cable following installation, but prior to final connection;
- Testing and adjustment/calibration of all process instrumentation;
- Testing of the process control system following connection to yard features associated with the pumping system;
- Testing of the electrical grounding system for treatment system;
- Testing of the incoming electrical service by local utility providers;
- Chemical and bacteriological testing of the potable water line in accordance with the utility and state requirements; and
- Inspection of waste management practices.

#### **4.3.2.3 Quality Control Testing and Sampling**

This section summarizes the primary testing and sampling that will be performed by the Contractor as part of site construction. CDM Smith will verify that the results meet the Contract requirements.

##### **Earthwork**

Testing of granular materials and backfill/fill will be performed in accordance with specification Section 02200 – Earthwork and 02230 – Granular Materials. All geotechnical and materials testing will be performed by certified laboratories or testing services.

*02200 – Earthwork:* At all structures, prior to the placement of bedding material; concrete work mats; structural fill; or structural concrete, the Contractor will coordinate with the soils testing laboratory to verify the suitability of the existing subgrade soil and to perform in-place soil density tests as required to verify that the bearing capacity of the subgrade is sufficient.

Prior to and during placement of backfill and fill, the Contractor will coordinate with the soils testing laboratory to perform in-place soil density tests to verify that the backfill/fill material has been compacted in accordance with the compaction requirements of the Contract Documents. The Illinois EPA or Resident Engineer Representative may designate areas to be tested.

*02230 – Granular Materials:* At least 7 days prior to the placement of any backfill or fill materials, the Contractor will deliver a representative sample of the proposed materials weighing at least 50 lbs to the Contractor's soil testing laboratory. The Contractor's material testing laboratory shall perform:

- Grain size analyses of the samples to determine their suitability for use as backfill or fill material in conformance to the materials requirements specified in the Contract Documents.
- The appropriate Proctor analyses to determine the maximum dry densities required for compaction testing as specified in the Contract Documents.

The results and determinations of suitability shall be delivered to the Resident Engineer Representative no later than 3 days prior to the placement of backfill or fill materials.

**Sieve Analysis:** Sieve analysis to determine particle size distribution of granular materials to be used shall be performed in accordance with American Society of Testing and Materials (ASTM) ASTM D422. The particle size distribution for each material type shall meet the requirements of Section 02230 – Granular Materials.

**Moisture-Density Test:** A moisture-density relationship for the soil shall be determined in accordance with ASTM D698 (Standard Proctor) or ASTM D1557 (Modified Proctor), as specified in the Contract Documents. Illinois EPA or the Resident Engineer Representative may direct additional tests should soil materials change during the course of work.

### **Cast-in-Place Concrete**

Testing of concrete for cast-in-place structures will be performed in accordance with Section 03300 – Cast-In-Place Concrete. Testing will be performed by certified laboratories or testing services. The Contractor will provide test results to verify conformity with the Section 03300 and the stated ASTM Standards:

- Fine aggregates for conformity with ASTM C33 – sieve analysis, physical properties, and deleterious substances;
- Coarse aggregates for conformity with ASTM C33 – sieve analysis, physical properties, and deleterious substances;
- Cements for conformity with ASTM C150 – chemical analysis and physical properties;
- Pozzolans for conformity with ASTM C618 – chemical analysis and physical properties; and
- Proposed concrete mix designs – compressive strength, slump, and air content.

The batching, mixing transporting, placing, and curing of concrete shall be subject to inspection by Illinois EPA or the Resident Engineer Representative at all times. The Contractor shall advise the Resident Engineer Representative of their readiness to proceed at least 24 hours prior to each concrete placement. The Resident Engineer Representative will inspect the preparations for concreting including the preparations of previously placed concrete, the reinforcing steel and the alignment, cleanliness, and tightness of formwork. No placement shall be made without the inspection and acceptance of the Resident Engineer Representative.

Upon delivery, concrete compressive strength and slump testing of concrete will be performed in accordance with Specification Section 03300 – Cast-In-Place Concrete. Laboratories testing concrete materials shall be in compliance with ASTM E 329.

The Contractor will perform slump tests in the field immediately prior to placing the concrete. Such tests shall be made in accordance with ASTM C143. If the slump is greater than the specified range, the concrete shall be rejected. For Class A (non-structural) concrete, the slump range is required to be 1 to 4 inches and for Class D1/D2 (structural) concrete, the slump range is required to be 3 to 5 inches. If a high-range water-reducer (plasticizer) is used, the slump indicated will be measured before plasticizer is added. Plasticized concrete will have a slump ranging from 7 to 10 inches.

Sets of field control cylinder specimens will be taken by the Contractor during the progress of the work, in compliance with ASTM C31. A “set” of test cylinders consists of four cylinders: one to be tested at 7 days, two to be tested and their strengths averaged at 28 days, and the fourth may be used for a special test at 3 days or to verify strength after 28 days if the 28-day test results are low. When the average 28-day compressive strength of the cylinders in any set falls below the specified design strength or below proportional minimum 7-day strengths (where proper relation between 7- and 28-day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed to achieve the required strengths. The number of sets of concrete test cylinders taken of each class of concrete placed

each day shall not be less than one set per day, nor less than one set for each 150 cubic yards of concrete, nor less than one set for each 5,000 square feet of surface area for slabs or walls. Tests shall be done by a material testing lab retained by the Contractor. The test results must meet the design strength of 2,500 pounds per square inch (psi) for Class A and 4,000 psi for class D1/D2 concrete as 28 days.

The Contractor will test for air content on fresh concrete samples. Air content for concrete made of ordinary aggregates having low absorption shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173. If lightweight aggregates or aggregates with high absorptions are used, the latter test method shall be used.

The Illinois EPA or Resident Engineer Representative may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection, or determining the continuation of concrete work. The Contractor will cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through the operations, and furnish material and labor required for the purpose of taking concrete cylinder samples. The Contractor will cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding, and such incidental equipment as may be required.

### **Leachate Treatment System**

The Contractor will comply with the general requirements for testing and leachate treatment system startup as described in Section 13300 of the Contract specifications. Field testing (and if required, correction of deficiencies) shall be performed to prove the proper operation of all the system equipment, controls, and sequence functions, as required. Field testing shall be designated by the Contractor and acceptable to the Illinois EPA or their designated representative. The Contractor shall provide potable water for hydraulic testing. This water shall be tested, and if below effluent discharge criteria, will be disposed of with the treated leachate. The Contractor will demonstrate 48 continuous hours of successful system operation with the influent leachate at the site for the on-site performance testing. During the on-site performance testing, the Contractor shall demonstrate in the presence of the Illinois EPA or their designated representative that the system will meet the performance criteria specified in Table 13905-B of Section 13905 of the specifications.

### **Piping**

The Contractor will provide all air and water necessary for testing the piping systems as specified under Division 15 of the specifications. Following testing, the Contractor will remove all debris resulting from testing. The Contractor will provide all



apparatus and all other supplies or materials which may be necessary for testing the systems and operating the apparatus during the period while tests of any kind are being made or for carrying out the work of the Contract. The various piping systems will be subjected to water, smoke, or air tests and will hold tight at required pressures without extra pumping or water addition for the time intervals stated. Any additional tests, methods or materials that may be required by the local ordinances will be made as directed by the Resident Engineer Representative or the local inspection authority. The Contractor will provide for all repeated tests as necessary to make systems hold tight as required. The various piping will be tested using the following procedures:

*Soil, waste, drain and vent piping* – The Contractor will test rough drainage of soil, waste, drain, and vent piping by plugging piping where it terminates in the building or where it leaves the building by filling each system completely with water to the outlets on the roof after all outlets in section have been plugged or capped, for at least 1 hour duration. If it becomes necessary during the construction of the building to test a part of a section for any reason or to cover permanently any pipe before piping above the part or section has been completed, apply a water test to such part or section of the piping by maintaining a 10-foot head of water on the highest section of the piping and the test will hold tight for 1 hour.

*Water piping* – The Contractor will test all interior potable hot, cold, and protected water piping to a water pressure of 150 pounds per square inch (psi) to the lowest level and maintain this pressure without additional pumping for 2 hours.

*Ductile iron pipe* – The Contractor will test all ductile iron pipe for compliance with Section 02616 of the Specifications. The Contractor will submit detailed test procedures for Illinois EPA's and CDM Smith's review; in general, testing will be conducted in accordance with AWWA C600. The method and procedures for performing the hydrostatic pressure test will be approved prior to the test. Pressure pipelines will be subjected to a hydrostatic pressure of 150 pounds per square inch gauge (psig), and the test pressure will be maintained for a minimum of 2 hours. All valves and valve boxes will be properly located, installed, and operable prior to testing. The Contractor will furnish all gauges, meters, pressure pumps and other equipment needed to fill the line slowly and perform the required hydrostatic pressure test.

*Gas piping* – The contractor will test all gas piping with air under pressure as required and recommended by NFPA Pamphlet No. 54 Regulations, which are considered as part of Section 15410 of the Specifications.

### **Plumbing Equipment**

The Contractor will start up each piece of equipment and system and will make all adjustments so that the system is placed in proper operating condition. The

Contractor will provide manufacturer's services for testing and startup plumbing equipment, including:

- Water heaters;
- Reduced pressure backflow preventers; and
- Emergency showers and eye wash alarm units.

### **Groundwater and Multiphase Extraction System**

The groundwater and multiphase extraction system will be tested in accordance with Specification Section 13725. Following system installation, the Contractor will demonstrate the system performance to the satisfaction of the Illinois EPA and Resident Engineer Representative. The acceptance test shall be performed after installation of all equipment that may affect the system performance. The testing will be of sufficient complexity and duration to fully demonstrate the operability of all equipment and systems with respect to functionality, rate, and capacity over the specified operating ranges of the equipment provided. The Contractor shall provide documentation to the Illinois EPA and the Resident Engineer Representative of the testing conducted. The documentation will include all metrics recommended by the manufacturer, as well as demonstration of all aspects of performance, including flow, pressure in the conveyance, water level in the well, electrical consumption, and water temperature.

### **Heating/Ventilating/Cooling Systems**

The Contractor will provide the necessary labor, materials, transportation, and devices required to test, adjust, and balance the total heating-ventilating-cooling systems in accordance with Section 15990 of the Specifications. Testing, balancing, and operation of the systems will be performed by competent and experienced personnel, having formerly done similar work and whose qualifications and performance are subject to the approval of the Illinois EPA.

#### **Testing of the HVAC Air Systems will include, but not be limited to:**

- Balance the supply return and exhaust air systems in accordance with AABC or NEBB Standards by use of direct reading instruments such as an "anemotherm" or velometer that has been properly calibrated
- Temporarily add static pressure to the system to simulate the effect of dirty filters by blanking off portions of the filter section. The Contractor will confirm static pressure has been added with a new static pressure reading across the fan.
- The Contractor will perform air balancing in accordance with Section 15990 of the Specifications.

- Tabulation of the measurement in an Excel spreadsheet that includes:
- Opening number, type, size and design flow rate;
- Quantity of air in cubic feet per minute (cfm) at each air outlet and inlet;
- Dry bulb temperature in each room;
- Dry bulb temperature of the supply air;
- Outdoor dry and wet bulb temperature at the time of the tests; and
- Other data collected at each air moving device.
- Actual operating current and voltage for all legs of the electric heating coils.

The Contractor will prepare and submit testing and balancing reports to the Illinois EPA for review and approval. The Contractor will re-balance when required by the Illinois EPA, incorporating all changes and certify the systems have been tested and balanced to meet specified requirements.

#### **Process Instrumentation & Controls**

Process Instrumentation and Controls will be field tested in accordance with Specification Section 13300. The Contractor will submit a test plan after all hardware submittals have been approved. The test plan will demonstrate that the Contractor's Process Control System Integrator has designed and configured a system that meets the design Specifications. The test plan will be submitted prior to the preparation of the detailed test procedures and submit outlines of specific proposed tests. Submittals will include examples of the proposed forms and checklists. The test plan will include the following as a minimum:

- Bill of materials listing control system components;
- System hardware summary;
- A testing schedule describing the specific tasks to be performed and the time allotted for each task;
- Communications tests to the various PLCs for discrete and analog I/O data transfer;
- 100 percent I/O point test including all spare points based upon the previously submitted system I/O list;
- Test procedures that will include test descriptions, forms, and checklists to be used to control and document the required tests; and

- Test documentation that will include a copy of the signed-off test procedures upon completion of each required test.

The system will be tested using the system architecture and bill of materials of all hardware indicating manufacturer, model, and serial number. The documents for the test plan will be structured so that the Illinois EPA or their designated representative understands what the inputs are, what the predicted outputs should be, and what the actual outputs are. The test plan will have a sign-off and date block for the Process Control System Integrator, Contractor, and Illinois EPA.

### **Electrical**

The Contractor will perform acceptance testing for all motors and equipment provided under Divisions 01 and 16 in accordance with the individual specification sections. All electric equipment will be tested for conformance with industry standards, manufacturer's tolerances, and the design specifications prior to energizing equipment.

The electrical testing will include, at a minimum:

Specification Section		Applicable Test
01171	Electric Motors	Insulation resistance, phase rotation, electrical connections, current measurements
01174	Variable Frequency Drives	Field testing, load testing, factory testing, harmonic study
16015	Electrical Systems Analysis	Short circuit, selective coordination, arc flash study
16120	Wires and Cables (600 Volt Maximum)	600V insulation test, field testing per NETA Standard ATS-1999
16122	Fiber Optic Data Highway Network	Physical checkout, optical continuity check, attenuation power losses
16480	Low Voltage Motor Control Center(s)	Shop testing in accordance with NEMA and UL standards; physical, electrical and mechanical inspections; insulation, control wiring, phasing, and earth resistance test in accordance with NETA ATS; circuit breaker resistance, time-current characteristics, short-time pickup, ground-fault pickup and instantaneous pick up tests in accordance with NETA ATS; NEMA ICS-2.3 tests

Specification Section		Applicable Test
16502	Lighting Protection System	UL inspection
16660	Grounding System	Earth resistance testing in accordance with the IEEE Standard 3-point fall of potential method.
16720	Fire Alarm System	Physical checkout; field testing; performance testing per NFPA 72; performance testing in accordance with the Authority Having Jurisdiction
16721	Security Alarm System	Physical and performance testing in accordance with the fire authority
16781	Closed Circuit Television System	Physical and performance testing to the satisfaction of the Illinois EPA.
16859	Electrical Heat Trace System	Resistance of heating cable system
16950	Electrical System Testing and Settings	Acceptance testing per NETA ATS for the entire distribution system.

After the electrical distribution equipment has been energized the Contractor will perform at a minimum, the following tests:

- Phase rotation will be verified at the service entrance and distribution switchgear, motor control centers and panelboards. The phase rotation will be A, B, C from front to back, top to bottom, and from left to right.
- The taps on the transformers will be adjusted to produce a nominal voltage at the terminals of the transformers.
- All motors will be jogged to verify rotation.
- The full load current draw of each motor will be checked and recorded. Where power factor correction capacitors are provided, the capacitor will be in the circuit at the time of the measurement.

Interlocking, control and instrument wiring will be checked for each system and/or part of a system to prove that the system will function properly as indicated by control schematic and wiring diagrams.

#### Double Wall Pipe and Leak Detection

The Contractor will test all double wall pipe and leak detection in accordance with Specification Section 02680. The Contractor will, at a minimum:

- Perform hydrostatic testing of all single-walled piping and the inner pipe of double-walled piping:
  - Test pressures for all piping systems shall not exceed 150 percent of the least rated piping, fitting, or valve installed in the system;
  - Piping shall be tested up to 150 percent of the maximum operating pressure (MAOP) of the lowest rated component of each specified line segment. Once the target is reached, the Contractor will allow 3 hours for diametric expansion of HDPE and PP pipe.
  - After the pipeline has had time for equilibration, the test section shall be returned to 150 percent of the MAOP, the pump turned off, and a final test pressure held for 2 to 3 hours.
  - If there is a leak observed, then the pipeline fails the test. If the amount of makeup water required to return the pipe to the initial test pressure exceed the volume allowed for expansion under the test pressure, as defined by the pipe manufacturer, the pipeline fails the test.
- Conduct pneumatic leak testing on the secondary containment piping of the double walled HDPE and PP pipeline instruments:
  - The inner pipe of the double walled HDPE or PP piping shall remain full of water, but not pressurized above 2 psi throughout the pneumatic testing to prevent collapse;
  - Pneumatic leak test shall conform to the requirements of Section 02680, ANSI B31.3, and to the manufacturer's instructions;
  - Pneumatic test pressures shall not exceed 10 psi and test pressure shall be maintained for a minimum of 2 hours;
  - The Contractor shall cap off the inner pipe and the containment annulus separately and provide pressure gauges on each of the inner pipe and each end of the annulus (four gauges); and
  - A "leak" shall be defined as a formation of bubbles observed when a soap solution is applied. For double walled HDPE and PP, a leak in the outer containment piping wall will be indicated by a drop in the containment gauge. A leak in the carrier piping will be indicated by an increase in the inner piping pressure.

All leak testing shall be witnessed by Illinois EPA. Illinois EPA will be notified at least 72 hours in advance of testing. In general, service leak testing shall be conducted on the following systems: all equipment, equipment connections and pipeline; instruments and instrument tubing connections to equipment, piping, or ducting;

flanges or other connections temporarily blinded or capped for hydrostatic or pneumatic testing.

The Contractor shall develop detailed procedures for leak testing based on the minimum requirements of the Drawings and manufacturer's instructions. A written plan for proper flushing and testing of each pipeline shall be submitted to the Resident Engineer Representative for approval two weeks prior to the start of work, which shall include:

- Schematic map(s) of the project showing points of connection and flushing points;
- Mechanical flow diagram(s) marked to identify the boundaries of the test and valve lin-up;
- The type of pipeline being flushed and tested with a notation of whether it is above or below ground;
- Make and model number of the backflow prevention device(s) and flow meter used to connect the water system for flushing and testing;
- Calculations for sizing of source water connection(s), flushing velocities, and total quantity;
- A detailed work schedule listing the approximate dates for each activity;
- Detailed procedures for each activity that are in accordance with Specification Section 02680;
- Water disposal considerations and compliance procedures for flushing;
- Emergency contact information; and
- Air relief plan showing all points of air bleeds.

The contractor shall provide all equipment and material required for flushing and hydrostatic and pneumatic testing. Leak testing shall be limited to 1,000-foot intervals or between isolation valve locations, whichever is the shorter distance. If impractical to test in place, and if specifically approved by the Illinois EPA, short runs or spools of piping may be interconnected and tested together. Under no circumstances shall the total time under the test exceed eight (8) hours at 1.5 times the pressure rating of the lowest rated component in the system. If the test is not completed due to leakage, equipment failure, etc., the test section shall be allowed to "relax" for eight (8) hours prior to the next test. Pipeline trenches will not be backfilled until successful completion of the leak test and the test results have been accepted by the Illinois EPA.

### **4.3.3 Acceptance of Work**

The routine acceptance of construction for definable features of work will be documented in writing. As indicated above in this section and further described in Section 4.5, all work completed by the Contractor will be documented in the Resident Engineer Representative's logbook and summarized in Daily Reports by the Contractor on a routine basis. This includes the scope and results of construction QA/QC inspection and testing activities.

For shop testing of the leachate treatment system, which is a critical milestone for project success, the following additional documentation will be completed:

- A shop testing report will be prepared by the Contractor, which details the scope and results of testing and includes a punch list of outstanding work items.
- A formal acceptance letter will be transmitted by the Illinois EPA to the Contractor upon Illinois EPA's determination that the treatment system is complete and fully functional, which authorizes the Contractor to proceed with shipment of the treatment system to the site.

## **4.4 Meetings**

### **4.4.1 Pre-Construction Conference**

Following issuance of the NTP, the Illinois EPA will schedule, conduct, and administer a pre-construction conference at a central site, convenient to all parties. The purpose of the pre-construction conference is to discuss the project in detail, identify and resolve any issues requiring clarification, and achieve understanding among all parties regarding the requirements for completion of work. The Contractors' schedules, particularly coordination between the Building Contractor and Process Contractor will be discussed.

Participants at the pre-construction conference will include the following:

- Illinois EPA
- Illinois EPA's Representative
- Resident Project Representative
- Contractor's Superintendent
- Major Subcontractors

Additional participants may include the following:

- U.S. EPA



- The City of Rockford
- The Rockford Park District

The following issues will be discussed during this conference:

- Distribution and discussion of:
- List of major subcontractors and suppliers
- Projected construction schedules
- Critical work sequencing
- Major equipment deliveries and priorities
- Project coordination and designation of responsible personnel
- Procedures and processing of:
- Field decisions
- Proposal requests
- Submittals
- Change orders
- Applications of Payment
- Adequacy of distribution of Contract Documents
- Procedures for maintaining Record Documents
- Use of premises:
- Office, work, and storage areas
- Illinois EPA's requirements
- Construction facilities, controls, and construction aids
- Temporary utilities
- Housekeeping procedures

#### **4.4.2 Progress Meetings**

The Contractor will conduct weekly progress meetings during active periods of work through the duration of construction. The purpose of these meetings is to discuss project status, schedule, and issues requiring clarification or resolution. The schedule, agenda, and minutes for each meeting will be coordinated by the Contractor. On-site personnel from all parties will assemble in the site trailer for these meetings; all other participants will tie in via telephone from their respective locations.

#### **4.4.3 Work Deficiency and Resolution Meetings**

Work deficiencies and resolutions will generally be discussed during weekly progress meetings. If necessary, the Illinois EPA, Contractor, or CDM Smith will arrange for separate meetings that are dedicated to addressing work deficiency issues. The purpose of such discussions or meetings is to: 1) clearly define any work deficiencies and their corresponding resolutions and 2) monitor the status of corrective action work until complete. The CDM Smith and Contractor construction QA/QC representatives will participate during these meetings.

### **4.5 Documentation**

#### **4.5.1 Field Logbook**

The Resident Engineer Representative will record the scope and results of all field inspections and tests in the logbook, as per CDM Smith Technical Standard Operating Procedure (SOP) 4-1, Field Logbook Content and Control, which is included in Appendix A.

With regard to this project, the following general types of information will be recorded on a routine basis:

- Date and weather conditions;
- Personnel and equipment on site;
- Status of construction activities;
- Details regarding deliveries of supplies and equipment;
- Details regarding wastes generation, handling, characterization, and storage;
- Details regarding off-site shipments of wastes, including transporter and disposal facility information;
- Scope and results of onsite meetings (e.g., planning, health and safety, construction QA/QC);
- Scope and results of construction QA/QC activities;

- Scope and results of health and safety activities;
- Scope and results of site visits and inspections by local authorities;
- Scope and results of interactions with property owners and the public;
- Details regarding any accidents or health and safety incidents;
- Details regarding field changes and change orders;
- Details of measurements for pay items; and
- Documentation and measureable quantities (if applicable) of green remediation practices implemented.

#### **4.5.2 Daily Reports**

Daily reports will be prepared by the Contractor to provide a daily record of construction progress, summarize QC activities, and highlight matters requiring action. The daily report will include, but not be limited to the following items:

- Project name, location, and date;
- List of subcontractors at the site;
- Weather conditions including temperature (high and low), barometric pressure, wind direction and speed, last precipitation event, amount of precipitation;
- Current construction activities;
- Accidents and unusual events;
- Stoppages, delays, shortages, and losses;
- Description and location of areas being tested or observed;
- Off-site materials received and quality verification documentation;
- Calibration of test equipment;
- Inspections performed;
- Equipment, personnel, and work at each unit;
- Any problems or concerns with regard to site operations;
- Items requiring action and resolution;

- Orders and requests of governing authorities;
- Services connected or disconnected;
- Equipment or system tests and startups;
- All construction QC data and information collected;
- Visitor records;
- In-field modifications; and
- Substantial completions authorized.

The Contractor will submit their daily QC reports to the Resident Engineer Representative for review. The Resident Engineer Representative will review the reports for consistency with their observations and logbook entries. Duplicate copies of the daily report will be submitted to the Illinois EPA at weekly intervals.

#### **4.5.3 Standard Forms**

In addition to the daily reports, the Contractor will document details for certain types of activities using standard forms. The following standard forms are included in Appendix B:

- Construction Accident Report;
- P.E. Certification;
- Submittal Review Form;
- Daily Status Report;
- Application for Payment;
- Field Order;
- Field Orders Tracking Log;
- Work Change Directive;
- Work Change Directive Log;
- Change Order;
- Change Orders Tracking Log;
- Certificate of Substantial Completion;

- Soil Compaction Quality Control Test Results Tracking Log;
- Concrete Slump and Compressive Strength Quality Control Test Results Tracking Log;
- Photo Log; and
- Submittal Tracking Log.

#### **4.5.4 “Working copy” of Specifications and Drawings**

A “working copy” of the Contract Specifications, Contract Drawings, and Contractor’s approved detailed design drawings will be reserved by the Contractor for use in recording as-built information during the course of construction. Variations between the design and as-built conditions will be noted on the working copy using red ink, along with the corresponding date of entry and author’s initials.

Following the completion of construction, CDM Smith will use the working copy to verify that the as-built conditions of construction have been accurately recorded on the Contractor’s record drawings.

#### **4.5.5 Field Project Files**

A copy of the project files will be maintained at the site during on-site construction. The Contractor will be responsible for establishing and maintaining these files. The project files will include, but not be limited to, the following:

- Project personnel information;
- Permits;
- Meeting minutes;
- Correspondence;
- Submittals and submittal reviews;
- Requests For Information (RFI);
- Telephone call reports;
- Construction progress schedules;
- Daily reports;
- Schedule of values;
- Partial payment applications;

- Photographs and photo logs;
- Field orders;
- Work change directives;
- Change orders;
- Test and inspection records;
- Accident reports;
- Certificate of Substantial Completion;
- Certificate of Construction Completion;
- Record drawings;
- Certifications; and
- Log books.

The project files will be maintained by the Contractor in the field using portable, water resistant, lockable filing containers. The file containers will be kept in the field trailer and locked when the Contractor is not present. The file structure will generally coincide with the divisions and sections of the Contract specifications; approved Contractor submittals and related project correspondence will be organized accordingly. The file structure will also include separate sections for resident engineering and field administration records, such log book notes, photographs, forms, schedules, meeting minutes, change orders, and other documents required from the Contractor under this work assignment.

The Project/Resident Engineer will be responsible for ensuring that all approved Contractor submittals and other pertinent documents are sent to the Resident Engineer Representative in a timely manner. Likewise, the Resident Engineer Representative will be responsible for promptly sending copies of all field documents to the Project/Resident Engineer, by fax or e-mail when feasible.

QA audits of the field and office project files will be performed by CDM Smith QA staff to verify the files are maintained in accordance with the Contract requirements. The audits will be performed by someone thoroughly familiar with construction projects. The scope and results of these audits and any corrective actions will be documented and distributed to CDM Smith's management.

#### **4.5.6 Project Photographs**

All field activities will be photographed via digital camera by both CDM Smith and the Contractor. CDM Smith will perform photographic documentation in accordance with CDM Smith's Technical SOP 4-2, Photographic Documentation of Field Activities, which is included in Appendix A. Photographic documentation activities will be documented in the field logbook and on a photograph tracking log. The photograph tracking log will be updated on a weekly basis.

For photographs taken by both CDM Smith and the Contractor, the photographs will be downloaded from the camera(s) on a daily basis. The photographs will either be downloaded to a server that is routinely backed up or the photographs will be burned on a CD.

## **Section 5**

# **Construction Management Activities**

### **5.1 Purpose**

The purpose of this section is to describe the construction management procedures to be implemented by the Contractor on this project. In particular, this section focuses on the procedures that will be used for overall management of construction schedule and cost. This Section shall be finalized by the Building Contractor and Process Contractor prior to the start of construction.

### **5.2 Procedures**

#### **5.2.1 Review Resident Engineer's Field Observations and Documentation**

The most important means of measuring construction progress are resident engineering inspection, testing, and documentation, as described in Section 4.3 and Section 7. The Resident Engineer Representative's observations, field logs, photographs, and internal reports will be used by the Site Manager and Project/Resident Engineer to: 1) verify the accuracy of submittals and invoices received from the Contractor and 2) ensure that the work is properly staffed, equipped, and managed on site by the Contractor to meet critical schedule milestones. As a result of these reviews, the Site Manager or Project/Resident Engineer shall promptly raise any significant scope, schedule, or cost issues with the Contractor for discussion and resolution.

#### **5.2.2 Review Contractor Schedules**

The Contractor is required to submit a construction schedule and to routinely update it during the course of work. These schedule submittals will be reviewed by the Project Engineer and Site Manager to gauge progress and identify any trends that may impact cost or schedule. Particular attention will be placed on ensuring that critical lead items (e.g., local permit and inspection requirements, utility service installation) and risk considerations (e.g., natural disasters) are properly identified, planned for, and attended to. As a result of these reviews, the Site Manager or Project/Resident Engineer will promptly raise any significant scope, schedule, or cost issues with the Contractor for discussion and resolution.

#### **5.2.3 Review Contractor Invoices**

The Contractor must submit invoices using forms provided by Illinois EPA to obtain progress payments for completed work. The invoices will be reviewed by the Project Manager and Site Manager to track payment progress and incurred-to-date cost. Definable items of work must be completed and accepted before payment can be made. The Project Manager and Site Manager will review each invoice for consistency with actual work completed, as per the Resident Engineer Representative's field



records. Additional input or clarification will also be obtained from the Resident Engineer Representative, when necessary to complete such reviews. Any discrepancies or inaccuracies identified by Illinois EPA or CDM Smith from invoice reviews will be promptly raised with the Contractor by the Project Manager for discussion and resolution.

If the Project Manager or Site Manager determines that the invoice is inconsistent, incorrect, or otherwise unsatisfactory in any manner, the subject invoice will be returned to the Contractor for correction.

#### **5.2.4 Attend Meetings**

As indicated in Section 4.4, the Contractor is required to participate in various planning and progress meetings during the course of work to discuss and resolve issues pertaining to work scope, schedule, and payment. As also indicated, the Site Manager and Project/Resident Engineer will participate in these meetings. The meetings will be used as a tool to effectively track all work in planning and progress and to identify, discuss, and resolve scope, schedule, and payment issues before they become problems.

## Section 6

# Administration and Approval of Changes in Work

### 6.1 Purpose

The purpose of this section is to describe the administrative procedures that will be used by Illinois EPA and CDM Smith to approve and document any necessary changes in work that occur during the course of construction. **This Section shall be finalized by the Building Contractor and Process Contractor prior to the start of construction.**

### 6.2 Definitions

The following definitions apply to this section:

- Field Order - A field order is a written order issued by Illinois EPA or CDM Smith, which orders minor changes in work to be performed in accordance with the general conditions of the Contract and does not involve a change in Contract price or schedule. It is also typically used to document clarifications and interpretations in the Contract documents. A copy of CDM Smith's standard field order form is included in Appendix B and will be used for this purpose. Field orders must be approved in advance by the Project/Resident Engineer or Site Manager.
- Work Change Directive - A work change directive is a written directive from Illinois EPA or CDM Smith to the Contractor, ordering: 1) the addition, deletion, or revision of work or 2) response to emergencies or unexpected physical conditions under which the work is to be performed. A work change directive will not change the Contract price or schedule. However, it serves to document Illinois EPA's, CDM Smith's, and the Contractor's intent to subsequently incorporate work changes associated with such directives into change orders (defined below), following negotiations as to the effect, if any, on Contract price and schedule. A copy of CDM Smith's standard work change directive form is included in Appendix B and will be used for this purpose. Work change directives must be approved in advance by the Site Manager.
- Change Order - A change order is a written order issued by Illinois EPA or CDM Smith to the Contractor. Change orders are issued as a result of changed or unexpected conditions encountered during the course of work, which require changes to one or more of the following: 1) scope of work and 2) materials, methods, or equipment. They are used to document changes to the Contract documents by increasing or decreasing scope of work, altering the character of work, adjusting the schedule requirements, and/or establishing the price for such changes. A copy of CDM Smith's standard change order form is included in

Appendix B and will be used for this purpose. Change orders must be approved in advance by the Site Manager and the Contract Manager.

## **6.3 Procedures**

### **6.3.1 Field Orders**

Field orders will be issued by the Illinois EPA or CDM Smith to approve and document all minor changes in work, that do not involve significant changes in scope, or any changes to the Contract price or schedule. Minor changes in work are generally considered to be changes that do not impact: 1) treatment processes and building design or philosophy, 2) terms and conditions of property access agreements, and 3) terms and conditions of local permit equivalency approvals.

The following procedures will be used for issuing field orders:

- Upon identifying the need for a field order, the Resident Engineer Representative will verbally notify the Project/Resident Engineer and Site Manager regarding the scope of the associated change in work;
- The Project/Resident Engineer or Site Manager will, in turn, provide the Illinois EPA Project Manager with courtesy notification regarding the scope of the field order and request verbal consent;
- The Project/Resident Engineer or Resident Engineer Representative will document the associated changes in scope on the field order form (included in Appendix B). If completed by the Resident Engineer Representative, the form will be sent via fax or e-mail, to the Project/Resident Engineer for review and approval.
- The Project/Resident Engineer will review the field order, make any necessary revisions, approve it (i.e, signing and dating it), and return it to the Resident Engineer Representative.
- The Resident Engineer Representative will request that the Contractor's site superintendent or authorized representative approve the field order by signing and dating it. The Contractor will not be allowed to initiate any work associated with the field order until it has been approved by both parties.
- Copies of the executed field orders will be distributed by the resident engineer or representative to the project engineer, Illinois EPA Project Manager, and Contractor, and maintained in the field and office project files.

### **6.3.2 Work Change Directives**

Work change orders will be issued by the Illinois EPA or CDM Smith to document and approve changes in work, which: 1) involve significant changes in Contract scope

AND 2) require prompt action to avoid or minimize significant impacts to schedule or cost. Significant changes in work are all changes that cannot be considered minor, as defined in Section 6.3.1. Work change orders do not change the Contract price or schedule. Rather, they serve to document the Illinois EPA's, CDM Smith's, and the Contractor's intent to subsequently incorporate the associated changes as part of corresponding change orders, following negotiations regarding the effect of such changes, if any, on Contract price or schedule. All work change directives will lead to the issuance of corresponding change orders, as covered under Section 6.3.3.

The following procedures will be used for issuing work change directives:

- Upon identifying the need for a work change directive, the Resident Engineer Representative will verbally notify the Project/Resident Engineer and Site Manager regarding the scope of the associated change in work, along with benefit (i.e., in terms of impact to schedule and/or cost) for implementing prompt action versus waiting for a change order to be processed and approved;
- The Project/Resident Engineer or Site Manager will, in turn, provide the Illinois EPA PM with courtesy notification regarding the scope of the work change directive, along with the associated impacts to scope and/or schedule that could result;
- The Project/Resident Engineer or Resident Engineer Representative will document the associated changes in scope on the work change directive form (included in Appendix B), and the form will be sent to the Site Manager for review and approval;
- The Site Manager, in consultation with the Project/Resident Engineer and Project Manager, will review the work change directive, make any necessary revisions, and approve it (i.e., by signing and dating it);
- The Site Manager will return the work change directive form to the Resident Engineer Representative;
- The Resident Engineer Representative will request that the Contractor's site superintendent or authorized representative approve the work change directive by signing and dating it. The Contractor will not be allowed to initiate any work associated with the work change directive until it has been approved by both parties.
- Copies of executed work change directives will be distributed by the Resident Engineer Representative to Site Manager, Project/Resident Engineer, Contractor, and the Illinois EPA Project Manager and maintained in Contractor's field office and CDM Smith's project files;

- Change orders will be initiated by the Project/Resident Engineer concurrently with work change directives, as described in Section 6.3.3.

### **6.3.3 Change Orders**

Change orders will be issued by the Illinois EPA or CDM Smith to document and approve changes in work, which involve significant changes in Contract scope or any changes to Contract schedule or price. Significant changes in work are all changes that are not considered to be minor, as defined in Section 6.3.1.

The following procedures will be used for issuing change orders:

- Upon identifying the need for a change order, the Resident Engineer Representative will verbally notify the Project/Resident Engineer and Site Manager regarding the scope of the associated change in work, along with the potential impacts to schedule and/or cost.
- The Project/Resident Engineer or Site Manager will, in turn, provide the Illinois EPA Project Manager with notification regarding the scope of the change order, along with the associated impacts to scope and/or schedule that could result. If there is a potential that the change order may require consent by the Illinois EPA Contracting Officer, then such notification will also be provided to the Illinois EPA Contracting Officer.
- The Project/Resident Engineer or Resident Engineer Representative will document the associated changes in scope on the change order form (included in Appendix B), then send the form to the Site Manager for review and approval.
- The Site Manager, in consultation with the Project/Resident Engineer and Project Manager, will review the change order, make any necessary revisions to it, and approve it (i.e, by signing and dating it). If necessary, the Site Manager will arrange for a meeting with the Contractor to negotiate any conditions of the change order that are not readily acceptable to both parties, prior to completing this step.
- The Site Manager will send the change order to the Project Manager for approval.
- The Project Manager will approve the change order, by signing and dating it, and send the change order to the Contractor for review and written approval. The Contractor will not be allowed to initiate any work associated with the change order until it has been approved by both parties.
- The Contractor will return a signed copy of the change order to the Contracts Manager.

Copies of executed change orders will be distributed to the Site Manager, Project/Resident Engineer, Resident Engineer Representative, Contractor, and Illinois EPA Project Manager and maintained in Contractor's field office and CDM Smith's office project files.

## **Section 7**

# **Project Completion and Record Documentation**

### **7.1 Verification of Project Completion**

This section describes the processes by which the work is inspected, tested, and approved. This Section shall be finalized by the Building Contractor and Process Contractor prior to the start of construction.

The construction completion process for the RA includes four primary phases conducted in the following order:

1. Punch-Out Inspection and Testing
2. Pre-Final Inspection
3. Initial Testing Program (ITP)
4. Final Inspection

Substantial Completion for the building and leachate treatment system is determined based on acceptance of the Pre-Final Inspection, and Construction Completion is achieved after all four of these processes are completed. The leachate treatment system will operate under the 1-year Operational and Functional (O&F) period, whereby the Process Contractor shall operate the system. If the Process Contractor is directed to operate the treatment system beyond the ITP, a Post-Final Inspection will be conducted once the Contractor completes operation, maintenance, and monitoring of the system to ensure that all the equipment is in good condition and that all work items and deficiencies have been addressed and corrected prior to transfer to the Illinois EPA.

Separate notifications of Substantial Completion and Construction Completion will be given for building construction and the leachate treatment system.

The Contractor will provide advance, written notification to the Site Manager regarding the tentative date for each inspection or testing event, and initiate scheduling of the inspection/testing date. The Site Manager will, in turn, consult with the Project/Resident Engineer and other applicable parties (e.g., Illinois EPA Project Manager), and finalize the respective inspection/testing date. Prior to the inspection/testing, the Contractor will also submit an agenda to the Illinois EPA and CDM Smith.

The Project/Resident Engineer, in consultation with the Resident Engineer Representative, will prepare an internal checklist in advance of each

inspection/testing event, which will be used to verify that the work is complete and acceptable.

The scope and results of all inspection and testing activities will be recorded by the Project/Resident Engineer or Resident Engineer Representative in the log book and daily reports, as per Section 4.5.1 and 4.5.2. During the inspection, the completion status of all checklist items will be recorded, and the physical conditions of the site and treatment system will be photo-documented by CDM Smith.

All inspections and testing will be performed in accordance with specification Section 01700 – Contract Closeout and Section 13905 – Package Leachate Treatment System – Performance Specification.

### **7.1.1 Punch-out Inspection and Testing**

Near the completion of all work required for completion of the building and leachate treatment system, the Project/Resident Engineer or Resident Engineer Representative shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Upon completion of the inspection and adjustment or replacement of individual components and systems, the Contractor shall demonstrate that each system of related instrumentation and control equipment operate together in accordance with the Contract specifications. The testing shall show that the equipment operates free of excessive noise or vibration, that the equipment is responsive to manual and automatic controls, that control and protective devices are properly set, and that the equipment will operate as designed. Testing of the leachate system shall be performed using potable water.

The Project/Resident Engineer or Resident Engineer Representative shall make a second inspection to ascertain that all identified deficiencies have been corrected. Once this is accomplished, the facility is ready for the "Pre-Final" Inspection as described in Section 7.1.2.

### **7.1.2 Pre-final Inspection**

Substantial completion of construction, as defined in the Contract documents, will be determined by Illinois EPA or CDM Smith based upon the results of a Pre-Final Inspection. At minimum, the following representatives will be in attendance during the inspection: Illinois EPA Project Manager, Site Manager, Project/Resident Engineer, Resident Engineer Representative, Contractor's project manager, and Contractor's site superintendent. The inspection will be performed for the treatment system and building over the course of a one-day period. At minimum, it will include a visual inspection of the work completed to determine project completeness and conformance with the Contract documents and "As-built" drawings and specifications.

Upon completion of the Pre-Final Inspection, CDM Smith will prepare a "Pre-Final Punch List" of items that require correction. The list will be provided to the



Contractor, who will correct all deficiencies prior to the Final Inspection, which is described in Section 7.1.4. In addition, an inspection report will be prepared by CDM Smith for submittal to Illinois EPA along with the Pre-Final Punch list as described in Section 7.2.1.

### **7.1.3 Initial Testing Program**

Following Substantial Completion of construction, the Contractor must demonstrate that the treatment system and building meets the performance criteria specified in the Specifications and Drawings of the Contract documents. On-site performance will be demonstrated based upon the successful completion of a comprehensive Initial Testing Program (ITP), where the Contractor will demonstrate that the treatment system is capable of continuous operation in accordance with Section 13905 of the Contract specifications. Performance verification will be based upon the results of sampling and field measurements collected during the ITP. The Contractor is responsible for making all repairs, replacements or adjustments necessary to meet the required performance criteria.

The ITP for the treatment system will take approximately two days to complete. The Contractor will complete the ITP activities in accordance with the requirements specified in Section 13905 of the specifications and as directed by the Project/Resident Engineer.

During performance of the ITP, the Project/Resident Engineer or Resident Engineer Representative will, among other responsibilities indicated above, verify that all field samples and measurements are completed by the Contractor in accordance with Section 13905 of the specifications, and the site QAPP.

The ITP will continue until the testing results in the field indicate that required performance criteria have been met. Such results will include system performance measurements [uptime, flow rates, pressure readings, influent/effluent (water, vapor) quality measurements], environmental measurements (water levels, groundwater water quality measurements), and analytical data from corresponding sampling where quick-turn-around results are available.

### **7.1.4 Final Inspection**

Construction Completion for the building and leachate treatment system will be determined by the Illinois EPA based upon the results of a Final Inspection. At a minimum, the following representatives will be in attendance during the inspection the: Illinois EPA Project Manager, Site Manager, Project/Resident Engineer, Resident Engineer Representative, Contractor's project manager, and Contractor's site superintendent. It will, at minimum, include a visual inspection of the work to determine project completeness and conformance with the Contract documents and "As-built" drawings and specifications. In particular, completion of all punch list items identified during the Pre-Final Inspection and any other outstanding items

identified during the ITP will be verified. Any incomplete work items identified by the Illinois EPA or CDM Smith during the final inspection will be corrected by the Contractor immediately and before final payment for construction is issued the Illinois EPA.

Upon completion of the Final Inspection, the Illinois EPA and CDM Smith will prepare a "Final Punch List" of items that require correction. The list will be provided to the Contractor and the Contractor shall correct all deficiencies immediately. All items requiring correction will be re-inspected by the Illinois EPA and CDM Smith. An inspection report will be prepared by CDM Smith for submittal to the Illinois EPA along with the Final Punch List as described in Section 7.2.3.

## **7.2 Record Documentation**

### **7.2.1 Pre-Final Inspection Report**

Following completion of the Pre-Final Inspection, the Project Engineer will prepare a Pre-Final Inspection Report, which summarizes the scope and results of the inspection and includes a punch list of incomplete work items. This report will be submitted to the Illinois EPA Project Manager by the Site Manager.

If the results of the Pre-Final Inspection indicate that Substantial Completion of the building and leachate treatment system construction has been achieved, the Site Manager will submit written notification of such findings to the Contractor. After Substantial Completion has been achieved, the Site Manager will provide direction to the Contractor to initiate the ITP.

If the Illinois EPA or CDM Smith determines that Substantial Completion has not been achieved, the Illinois EPA or Site Manager will submit written notification of such to the Contractor, along with a punch list of outstanding work items that must be addressed in order to achieve Substantial Completion. Completion of punch list items will be verified and documented by the Project/Resident Engineer or Resident Engineer Representative as part of a follow-up inspection.

### **7.2.2 Initial Testing Program Technical Memorandum**

Upon receipt and review of the validated data packages for all ITP samples collected by the Contractor, the CDM Smith Project/Resident Engineer will prepare a technical memorandum summarizing the scope and results of the ITP. The report will summarize pre-startup conditions for evaluating remedial system progress and confirm achievement of the remedial system performance requirements. The report will include, at a minimum, the following:

- Tabulated summary tables for groundwater data and field measurements;
- Tabulated summary table of compliance sampling and monitoring results to demonstrate leachate treatment system performance;

- Tabulated/graphed summary of leachate treatment system performance, including average flow rates and volume of groundwater extracted, mass removal rates, and percent operational uptime;
- Groundwater elevation iso-contour maps and capture zone estimates;
- Groundwater contamination iso-concentration maps;
- A summary of pre-startup conditions for evaluating remedial system progress and confirm achievement of the remedial system performance requirements; and
- Recommendations regarding future O&M activities.

This document will be submitted to the Site Manager for review and approval. If the sample results indicate that any performance criteria were not met, the Site Manager will provide written notification of such results to the Illinois EPA Project Manager immediately, along with a schedule of corrective actions (e.g., system adjustments, supplemental ITP testing) to be implemented.

### **7.2.3 Final Inspection Report**

Following completion of the Final Inspection, the Project/Resident Engineer will prepare a Final Inspection Report, which summarizes the scope and results of the inspection and includes a punch list of any incomplete work items, as per the work plan. This report will be submitted to the Illinois EPA Project Manager by the Site Manager.

If the results of the Final Inspection indicate that all of the required construction work has been completed, the Site Manager will submit written notification of such findings to the Contractor.

If any punch list items are identified by the Illinois EPA or CDM Smith, the Site Manager will submit written notification of such findings to the Contractor, along with a punch list of outstanding work items that must be addressed in order to achieve construction completion. Completion of punch list items will be verified and documented by the Project/ Resident Engineer or Resident Engineer Representative as part of a follow-up inspection.

### **7.2.4 Remedial Action Reports**

CDM Smith will prepare the following documents in accordance with the requirements of U.S. EPA's Closeout Procedures for National Priority List Sites, Office of Solid Waste and Emergency Response (OSWER) Directive 9320.2-09A-P, January 2000:

- CDM Smith will submit a draft Preliminary Close-out Report (PCOR) for review and comment by the Illinois EPA, following Construction Completion for both the

building and leachate treatment system. The report will address the leachate treatment system. A final PCOR will be submitted following receipt of technical review comments from the Illinois EPA.

- CDM Smith will submit the draft Interim RA Report for review and comment by the Illinois EPA, following Construction Completion for both the building and leachate treatment system. The final Interim RA Report will be submitted following receipt of technical review comments from the Illinois EPA. The report will, at minimum, include the following sections: 1) introduction, 2) site background, 3) construction activities, 4) chronology of events, 5) performance standards and construction quality control, 6) final inspection and certifications, 7) summary of project costs, 8) proposed leachate treatment system operation, maintenance, and monitoring, 9) observations and lessons learned, and 10) contact information.
- The report shall include field documentation that has been completed throughout the pre-construction, construction, and post-construction phases, such as daily field records and reports, data sheets, various construction-related forms and reports, photographic documentation, and field order, work change directive, and change orders that have been processed. A complete set of as-built drawings will also be included with the report.
- A signature page that confirms completion of the construction in accordance with the site ROD and all Illinois EPA approved plans and specifications prepared thereunder shall be included.

# **Appendix A**

## **CDM Smith Technical SOPs**

**Field Logbook Content and Control**

SOP 4-1  
Revision: 7  
Date: January 2012

**Prepared:** Del Baird

**Technical Review:** Laura Splichal

**QA Review:** Jo Nell Mullins

**Approved:** 

**Issued:**   
Signature/Date

Signature/Date

**1.0 Objective**

The objective of this technical standard operating procedure (SOP) is to set criteria for content entry and form of field logbooks. Field logbooks are an essential tool to document field activities for historical and legal purposes.

**2.0 Background****2.1 Definitions**

**Biota** - The flora and fauna of a region.

**Magnetic Declination Corrections** - Compass adjustments to correct for the angle between magnetic north and geographical meridians.

**2.2 Discussion**

Information recorded in field logbooks includes field team names; observations; data; calculations; date/time; weather; and description of the data collection activity, methods, instruments, and results. Additionally, the logbook may contain deviations from plans and descriptions of wastes, biota, geologic material, and site features including sketches, maps, or drawings as appropriate.

**3.0 General Responsibilities**

**Field Team Leader (FTL)** - The FTL is responsible for ensuring that the format and content of data entries are in accordance with this procedure.

**Site Personnel** - All CDM Smith employees who make entries in field logbooks during onsite activities are required to read this procedure before engaging in this activity. The FTL will assign field logbooks to site personnel who will be responsible for their care and maintenance. Site personnel will return field logbooks to the records file at the end of the assignment.

**Note:** Responsibilities may vary from site to site. Therefore, all field team member responsibilities should be defined in the field plan or site-/project-specific quality assurance plan.

**4.0 Required Equipment**

- Site-specific plans
- Indelible black or blue ink pen
- Field logbook
- Ruler or similar scale

**5.0 Procedures****5.1 Preparation**

In addition to this SOP, site personnel responsible for maintaining logbooks must be familiar with all procedures applicable to the field activity being performed. These procedures should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation. These procedures should be located at the field office or vehicle for easy reference.

Field logbooks shall be bound with lined, consecutively numbered pages. All pages must be numbered before initial use of the logbook. Before use in the field, each logbook will be marked with a specific document control number issued by the document control administrator, if required by the contract quality implementation plan (QIP). Not all contracts require document control numbers. The following information shall be recorded on the cover of the logbook:

**Field Logbook Content and Control**

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Date: January 2012

- Field logbook document control number (if applicable).
- Activity (if the logbook is to be activity-specific), site name, and location.
- Name of CDM Smith contact and phone number(s) (typically the project manager).
- Start date of entries.
- End date of entries.
- In specific cases, special logbooks may be required (e.g., waterproof paper for stormwater monitoring).

The first few (approximately five) pages of the logbook will be reserved for a table of contents (TOC). Mark the first page with the heading and enter the following:

**Table of Contents**

Date/Description (Start Date)/Reserved for TOC	Pages 1-5
---	--------------

The remaining pages of the table of contents will be designated as such with "TOC" written on the top center of each page. The table of contents should be completed as activities are completed and before placing the logbook in the records file.

**5.2 Operation**

Requirements that must be followed when using a logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the logbook. If data collection forms are specified by an activity-specific plan, this information does not need to be duplicated in the logbook. However, any forms used to record site information must be referenced in the logbook.
- Do not start a new page until the previous one is full or has been marked with a single diagonal line so that additional entries cannot be made. Use both sides of each page.
- Do not erase or blot out any entry at any time. Indicate any deletion by a single line through the material to be deleted. Initial and date each deletion. Take care to not obliterate what was written previously.
- Do not remove any pages from the book.

Specific requirements for field logbook entries include:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial and date all changes.
- Multiple authors must sign out the logbook by inserting the following:  
Above notes authored by:
  - (Sign name)
  - (Print name)
  - (Date)
- A new author must sign and print his/her name before additional entries are made.
- Draw a diagonal line through the remainder of the final page at the end of the day.
- Record the following information on a daily basis:
  - Date and time
  - Name of individual making entry
  - Names of field team and other persons onsite
  - Description of activity being conducted including station or location (i.e., well, boring, sampling location number) if appropriate
  - Weather conditions (i.e., temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
  - Level of personal protection used
  - Serial numbers of instruments
  - Equipment calibration information
  - Serial/tracking numbers on documentation (e.g., carrier air bills)

**Field Logbook Content and Control**

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Entries into the field logbook shall be preceded with the time (written in military units) of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being logged. All measurements made and samples collected must be recorded unless they are documented by automatic methods (e.g., data logger) or on a separate form required by an operating procedure. In these cases, the logbook must reference the automatic data record or form.

At each station where a sample is collected or an observation or measurement made, a detailed description of the location of the station is required. Use a compass (include a reference to magnetic declination corrections), scale, or nearby survey markers, as appropriate. A sketch of station location may be warranted. All maps or sketches made in the logbook should have descriptions of the features shown and a direction indicator. It is preferred that maps and sketches be oriented so that north is toward the top of the page. Maps, sketches, figures, or data that will not fit on a logbook page should be referenced and attached to the logbook to prevent separation.

Other events and observations that should be recorded include:

- Changes in weather that impact field activities.
- Deviations from procedures outlined in any governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personal protection equipment.
- Visitors to the site.

**5.3 Post-Operation**

To guard against loss of data as a result of damage or disappearance of logbooks, completed pages shall be periodically photocopied (weekly, at a minimum) and forwarded to the field or project office. Other field records shall be photocopied and submitted regularly and as promptly as possible to the office. When possible, electronic media such as disks and tapes should be copied and forwarded to the project office.

At the conclusion of each activity or phase of site work, the individual responsible for the logbook will ensure that all entries have been appropriately signed and dated and that corrections were made properly (single lines drawn through incorrect information, then initialed and dated). The completed logbook shall be submitted to the records file.

**6.0 Restrictions/Limitations**

Field logbooks constitute the official record of onsite technical work, investigations, and data collection activities. Their use, control, and ownership are restricted to activities pertaining to specific field operations carried out by CDM Smith personnel and their subcontractors. They are documents that may be used in court to indicate dates, personnel, procedures, and techniques employed during site activities. Entries made in these logbooks should be factual, clear, precise, and nonsubjective. Field logbooks, and entries within, are not to be used for personal use.

**7.0 References**

Sandia National Laboratories. 1991. *Procedure for Preparing Sampling and Analysis Plan, Site-Specific Sampling Plan, and Field Operating Procedures*, QA-02-03. Albuquerque Environmental Program, Department 3220, Albuquerque, New Mexico.

Sandia National Laboratories. 1992. *Field Operation Procedure for Field Logbook Content and Control*. Environmental Restoration Department, Division 7723, Albuquerque, New Mexico.



**Photographic Documentation of Field Activities**

SOP 4-2

Revision: 8

Date: January 2012

Prepared: David O. JohnsonTechnical Review: Sharon BudneyQA Review: Jo Nell MullinsApproved: 

Signature/Date

Issued: 

Signature/Date

**1.0 Objective**

The purpose of this technical standard operating procedure (SOP) is to provide standard guidelines and methods for photographic documentation, which include still and digital photography and videotape or DVD recordings of field activities and site features (geologic formations, core sections, lithologic samples, water samples, general site layout, etc.). This document shall provide guidelines designed for use by a professional or amateur photographer. This SOP is intended for circumstances when formal photographic documentation is required. Based on project requirements, it may not be applicable for all photographic activities.

**2.0 Background****2.1 Definitions**

**Photographer** - A photographer is the camera operator (professional or amateur) of still photography, including digital photography, or videotape or digital versatile discs (DVD) recording whose primary function with regard to this SOP is to produce documentary or data-oriented visual media.

**Identifier Component** - Identifier components are visual components used within a photograph such as visual slates, reference markers, and pointers.

**Standard Reference Marker** - A standard reference marker is a reference marker that is used to indicate a feature size in the photograph and is a standard length of measure, such as a ruler, meter stick, etc. In limited instances, if a ruled marker is not available or its use is not feasible, it can be a common object of known size placed within the visual field and used for scale.

**Slates** - Slates are blank white index cards or paper used to present information pertaining to the subject/procedure being photographed. Letters and numbers on the slate will be bold and written with black indelible marking pens.

**Arrows and Pointers** - Arrows and pointers are markers/pointers used to indicate and/or draw attention to a special feature within the photograph.

**Contrasting Backgrounds** - Contrasting backgrounds are backdrops used to lay soil samples, cores, or other objects on for clearer viewing and to delineate features.

**Data Recording Camera Back** - A data recording camera back is a camera attachment or built-in feature that will record, at the very least, frame numbers and dates directly on the film.

**2.2 Associated Procedures**

- SOP 4-1, *Field Logbook Content and Control*

**2.3 Discussion**

Photographs and videotape or DVD recordings made during field investigations are used as an aid in documenting and describing site features, sample collection activities, equipment used, and possible lithologic interpretation. This SOP is designed to illustrate the format and desired placement of identifier components, such as visual slates, standard reference markers, and pointers. These items shall become an integral part of the "visual media" that, for the purpose of this document, shall encompass still photographs, digital photographs, videotape recordings (or video footage), and recordings

## Photographic Documentation of Field Activities

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on DVDs. The use of a photographic logbook and standardized entry procedures are also outlined. These procedures and guidelines will minimize potential ambiguities that may arise when viewing the visual media and ensure the representative nature of the photographic documentation.

### 3.0 General Responsibilities

**Field Team Leader** - The field team leader (FTL) is responsible for ensuring that the format and content of photographic documentation are in accordance with this procedure. The FTL is responsible for directing the photographer to specific situations, site features, or operations that the photographer will be responsible for documenting.

**Photographer** - The photographer shall seek direction from the FTL and regularly discuss the visual documentation requirements and schedule. The photographer is responsible for maintaining a logbook per Sections 5.1, 5.2.4, and 5.3.1 of this SOP. Responsibilities will be defined in the project sampling plan.

**Note:** Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site/quality assurance project plan (QAPP).

### 4.0 Required Equipment

A general list of equipment that may be used:

- 35mm camera or disposable single use camera (35mm or panoramic use)
- Digital camera
- Extra batteries for 35mm camera
- Video camera and appropriate storage media (e.g., video tapes, DVDs)
- Logbook
- Indelible black or blue ink pen
- Standard reference markers
- Slates
- Arrows or pointers
- Contrasting backgrounds
- Medium speed, or multi purpose fine-grain, color, 35mm negative film or slide film (project dependent)
- Data recording camera back (if available)
- Storage medium for digital camera

### 5.0 Procedures

#### 5.1 Documentation

A commercially available, bound logbook will be used to log and document photographic activities. Review SOP 4-1, *Field Logbook Content and Control* and prepare all supplies needed for logbook entries.

**Note:** A separate photographic logbook is not required. A portion of the field logbook may be designated as the photographic log and documentation section.

#### Field Health and Safety Considerations

There are no hazards that an individual will be exposed to specific to photographic documentation. However, site-specific hazards may arise depending on location or operation. Personal protective equipment used in this operation will be site-specific and dictated through requirements set by the site safety officer, site health and safety plan, and/or prescribed by the CDM Smith Corporate Health and Safety Program. The photographer should contact the site safety officer for health and safety orientation before commencing field activities. The site health and safety plan must be read before entry to the site, and all individuals must sign the appropriate acknowledgement that this has been done.

The photographer should be aware of any potential physical hazards while photographing the subject (e.g., traffic, low overhead hazard, edge of excavation).

#### 5.2 Operation

##### 5.2.1 General Photographic Activities in the Field

The following sections provide general guidelines that should be followed to visually document field activities and site features using still/digital cameras and video equipment. Listed below are general suggestions that the photographer should consider when performing activities under this SOP:

## Photographic Documentation of Field Activities

SOP 4-2

Revision: 8

Date: January 2012

- The photographer should be prepared to make a variety of shots, from close-up to wide-angle. Many shots will be repetitive in nature or format, especially close-up site feature photographs. Consideration should therefore be given to designing a system or technique that will provide a reliable repetition of performance.
- All still film photographs should be made using a medium speed, or multi purpose fine-grain, color negative film in the 35mm format unless otherwise directed by the FTL.
- It is suggested that Kodak brand "Ektapress Gold Deluxe" film or equivalent be used as the standard film for the still photography requirements of the field activities. This film is stable at room temperature after exposure and will better survive the time lag between exposure and processing. It is suggested that film speed ASA 100 should be used for outdoor photographs in bright sunlight, ASA 200 film should be used in cloudy conditions, and ASA 400 film should be used indoors or for very low-light outdoor photographs.
- No preference of videotape or DVD brand along with digital storage medium is specified and is left to the discretion of the photographer.
- The lighting for sample and feature photography should be oriented toward a flat condition with little or no shadow. If the ambient lighting conditions are inadequate, the photographer should be prepared to augment the light (perhaps with reflectors or electronic flash) to maintain the desired visual effect.
- Digital cameras have multiple photographic quality settings. A camera that obtains a higher resolution (quality) has a higher number of pixels and will store a fewer number of photographs per digital storage medium.

### 5.2.2 General Guidelines for Still Photography

#### Slate Information

It is recommended that each new roll of film or digital storage medium shall contain on the first usable frame (for film) a slate with consecutively assigned control numbers (a consecutive, unique number that is assigned by the photographer as in sample numbers).

#### Caption Information

All still photographs will have a full caption permanently attached to the back or permanently attached to a photo log sheet. The caption should contain the following information (digital photographs should have a caption added after the photographs are downloaded):

- |   |   |
|---|---|
| ▪ Film roll control number (if required) and photograph sequence number | ▪ Description of activity/item shown (e.g., name of facility/site, specific project name, project number) |
| ▪ Date and time   | ▪ Direction (if applicable)   |
| ▪ Photographer  |   |

When directed by the sampling plan, a standard reference marker should be used in all documentary visual media. While the standard reference marker will be predominantly used in close-up feature documentation, inclusion in all scenes should be considered.

Digital media should be downloaded at least once each day to a personal computer; the files should be in either "JPEG" or "TIFF" format. Files should be renamed at the time of download to correspond to the logbook. It is recommended the electronic files be copied to a compact disc for backup.

#### Close-Up and Feature Photography

When directed by the sampling plan, close-up photographs should include a standard reference marker of appropriate size as an indication of the feature size and contain a slate marked with the site name and any identifying label, such as a well number or core depth, that clearly communicates to the viewer the specific feature being photographed.

**Photographic Documentation of Field Activities**

SOP 4-2

Revision: 8

Date: January 2012

Feature samples, core pieces, and other lithologic media should be photographed as soon as possible after they have been removed from their in situ locations. This enables a more accurate record of their initial condition and color. When directed by the sampling plan, include a standard reference color strip (color chart such as Munsell Soil Color Chart or that available from Eastman Kodak Co.) within the scene. This is to be included for the benefit of the viewer of the photographic document and serves as a reference aid to the viewer for formal lithologic observations and interpretations.

**Site Photography**

Site photography, in general, will consist predominantly of medium- and wide-angle shots. A standard reference marker should be placed adjacent to the feature or, when this is not possible, within the same focal plane.

While it is encouraged that a standard reference marker and caption/slate be included in the scene, it is understood that situations will arise that preclude their inclusion within the scene. This will be especially true of wide-angle shots. In such a case, the film/tape control number shall be entered in the photographic logbook along with the frame number and all other information pertinent to the scene.

**Panoramic**

In situations where a wide-angle lens does not provide sufficient subject detail, a single-use disposable panoramic camera is recommended. If this type of camera is not available, a panoramic series of two or three photos would be appropriate. Panoramas can provide greater detail while covering a wide subject, such as an overall shot of a site.

To shoot a panoramic series using a standard 35mm or digital camera, the following procedures are recommended:

- Use a stable surface or tripod to support the camera
- Allow a 20- to 30-percent overlap while maintaining a uniform horizon
- Complete two to three photos per series

**5.2.3 General Photographic Documentation Using Video Cameras**

As a reminder, it is not within the scope of this document to set appropriate guidelines for presentation or "show" videotape or DVD recording. The following guidelines are set for documentary videotape or DVD recordings only and should be implemented at the discretion of the site personnel.

Documentary videotape or DVD recordings of field activities may include an audio slate for all scenes. At the beginning of each video session, an announcer will recite the following information: date, time (in military units), photographer, site ID number, and site location. This oral account may include any additional information clarifying the subject matter being recorded.

A standard reference marker may be used when taking close-up shots of site features with a video camera. The scene may also include a caption/slate. It should be placed adjacent and parallel to the feature being photographed.

It is recommended that a standard reference marker and caption/slate be included in all scenes. The caption information is vital to the value of the documentary visual media and should be included. If it is not included within the scene, it should be placed before the scene.

Original video recordings will not be edited. This will maintain the integrity of the information contained on the videotape or DVD. If editing is desired, a working copy of the original video recording can be made.

A label should be placed on the videotape or DVD with the appropriate identifying information (project name, project number, date, location, etc.).

**5.2.4 Photographic Documentation**

Photographic activities must be documented in a photographic logbook or in a section of the field logbook. The photographer will be responsible for making proper entries.

## Photographic Documentation of Field Activities

SOP 4-2

Revision: 8

Date: January 2012

In addition to following the technical standards for logbook entry as referenced in SOP 4-1, the following information should be maintained in the appropriate logbook:

- Photographer name.
- If required, an entry shall be made for each new roll/tape/DVD control number assigned.
- Sequential tracking number for each photograph taken (for digital cameras, the camera-generated number may be used).
- Date and time (military time).
- Location.
- A description of the activity/item photographed.
- If needed, a description of the general setup, including approximate distance between the camera and the subject, may be recorded in the logbook.
- Record as much other information as possible to assist in the identification of the photographic document.

### 5.3 Post Operation

All film will be sent for development and printing to a photographic laboratory (to be determined by the photographer). The photographer will be responsible for arranging transport of the film from the field to the photographic laboratory. The photographer shall also be responsible for arranging delivery of the negatives and photographs, digital storage medium, or videotape or DVD to the project management representative to be placed in the project files.

#### 5.3.1 Documentation

At the end of each day's photographic session, the photographer(s) will ensure that the appropriate logbook has been completely filled out and maintained as outlined in SOP 4-1.

#### 5.3.2 Archive Procedures

- Photographs and the associated set of uncut negatives, digital media, and original unedited documentary video recordings will be submitted to the project files and handled according to contract records requirements. The project manager will ensure their proper distribution.
- Completed pages of the appropriate logbook will be copied weekly and submitted to the project files.

## 6.0 Restrictions/Limitations

This document is designed to provide a set of guidelines for the field amateur or professional photographer to ensure that an effective and standardized program of visual documentation is maintained.

It is not within the scope of this document to provide instruction in photographic procedures, nor is it within the scope of this document to set guidelines for presentation or "show" photography.

The procedures outlined herein are general by nature. The photographer is responsible for specific operational activity or procedure. Questions concerning specific procedures or requirements should be directed to the project manager or FTL.

**Note:** Some sites do not permit photographic documentation. Check with the site contact for any restrictions.

## 7.0 References

U. S. Army Corps of Engineers. 2001. *Requirements for the Preparation of Sampling and Analysis Plans*, EM 200-1-3. Appendix F. February.

U. S. Environmental Protection Agency. 1992. National Enforcement Investigations Center. *Multi-Media Investigation Manual*, EPA-330/9-89-003-R. p. 85. Revised March.

\_\_\_\_\_. Region IV. 2001. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Athens, Georgia. November.



## Construction Accident Report

### ACCIDENT INFORMATION

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location of Project: \_\_\_\_\_

Name of Contractor Performing the Work: \_\_\_\_\_

Date of Accident: \_\_\_\_\_ Day of Week \_\_\_\_\_ Time of Day \_\_\_\_\_

Name of Injured (or Property Damaged): \_\_\_\_\_

Injured's Job Title or position (if known) \_\_\_\_\_

Address of Injured \_\_\_\_\_

Description of Injury \_\_\_\_\_

How did Injury occur? \_\_\_\_\_

Did Injured die? \_\_\_\_\_ If so, Date: \_\_\_\_\_

Where did the Accident occur? \_\_\_\_\_

Was it discovered immediately? \_\_\_\_\_ If not, how long afterwards? \_\_\_\_\_

Has the Injured returned to work? \_\_\_\_\_

If Property Damaged resulted, Describe: \_\_\_\_\_

[Note: Use other side or additional sheets, as required]

Witnesses (names and addressed) \_\_\_\_\_

Employer (name and address) \_\_\_\_\_

Where was the Injured treated? (Name and address) \_\_\_\_\_

Doctor's Name: \_\_\_\_\_

**Send original to the Construction Coordinator or Project Manager IMMEDIATELY!**

**Keep a copy for the field office files**

**Complete a separate for each person injured**

Prepared By \_\_\_\_\_

# Contractor's Application For Payment No. \_\_\_\_\_

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer)
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

## APPLICATION FOR PAYMENT

### Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE .....	\$	
2. Net change by Change Orders.....	\$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2) .....	\$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate) .....	\$	
5. RETAINAGE:		
a. ____ % x \$ _____ Work Completed .....	\$	
b. ____ % x \$ _____ Stored Material .....	\$	
c. Total Retainage (Line 5a + Line 5b) .....	\$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c) .....	\$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application) .....	\$	
8. AMOUNT DUE THIS APPLICATION .....	\$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above).....	\$	

## CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is recommended by:	_____	_____ (Date)
	(Engineer)	
Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is approved by:	_____	_____ (Date)
	(Owner)	
Approved by:	_____	_____ (Date)
	Funding Agency (if applicable)	

## Progress Estimate

## Contractor's Application

For (contract):						Application Number:		
Application Period:						Application Date:		
A		B	Work Completed		E	F		G
Item		Scheduled Value	C	D	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F) B	Balance to Finish (B - F)
Specification Section No.	Description		From Previous Application (C + D)	This Period				
	Totals							



## Progress Estimate

## Contractor's Application

For (contract):						Application Number:				
Application Period:						Application Date:				
A				B	C	D	E	F		G
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (E) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

## Stored Material Summary

## Contractor's Application

For (contract):						Application Number:			
Application Period:						Application Date:			
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage (\$) (D + E - F)
			Date (Month/Year)	Amount (\$)	Amount (\$)	Subtotal	Date (Month/Year)	Amount (\$)	
		Totals							

## CERTIFICATE OF SUBSTANTIAL COMPLETION

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---

OWNER's Project No. \_\_\_\_\_

ENGINEER's Project No. \_\_\_\_\_

Project: \_\_\_\_\_

---

---

CONTRACTOR \_\_\_\_\_

Contract For: \_\_\_\_\_

Contract Date: \_\_\_\_\_

---

---

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To .....

OWNER

And To .....

CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

.....  
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the CONTRACTOR within \_\_\_\_\_ days of the above date of Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

---

---

The following documents are attached to and made a part of this Certificate:

---

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This certificate does not constitute and acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

---

---

Executed by ENGINEER on \_\_\_\_\_

\_\_\_\_\_  
ENGINEER

By.....

CONTRACTOR accepts this Certificate of Substantial Completion on \_\_\_\_\_

\_\_\_\_\_  
CONTRACTOR

By.....

OWNER accepts this Certificate of Substantial Completion on \_\_\_\_\_

\_\_\_\_\_  
OWNER

By.....



## Change Order Status Log

Project No.: \_\_\_\_\_ Project \_\_\_\_\_  
Contractor \_\_\_\_\_ Owner \_\_\_\_\_

C.O. No.	Description(s)	Amount	Cumulative Amount	Time	Recommended by CDM	Transmitted to Contractor	Signed by Owner

## Soil Compaction Quality Control Test Results Tracking Log

[illegible]

**Concrete Slump and Compressive Strength Quality Control Test Results Tracking Log**  
**Lawrence Aviation Industries Site**  
**Port Jefferson Station, New York**

[illegible]



## DAILY PROGRESS REPORT

Report No.: \_\_\_\_\_ Day No.: \_\_\_\_\_ Date: \_\_\_\_\_

Project:

Project No.:

Contractor:

Contract Time: SC: \_\_\_\_\_ days; FC: \_\_\_\_\_

Notice to Proceed:

Original SC Date: \_\_\_\_\_ FC Date: \_\_\_\_\_

Extensions of time granted:

Adjusted SC Date: \_\_\_\_\_ FC Date: \_\_\_\_\_

Days Elapsed: \_\_\_\_\_ Days Remaining: \_\_\_\_\_

Weather:

Visitors:

---

### ACTIVITIES

### MANPOWER

### EQUIPMENT

### DELIVERIES

### NOTES

Resident Project Representative: \_\_\_\_\_



Daily Progress Report  
September 15, 1999  
Page 2

Distribution:

## CHANGE ORDER

No.: \_\_\_\_\_

PROJECT \_\_\_\_\_

DATE OF ISSUANCE \_\_\_\_\_ EFFECTIVE DATE \_\_\_\_\_

OWNER \_\_\_\_\_

OWNER's Contract No. \_\_\_\_\_ Project No. \_\_\_\_\_

CONTRACTOR \_\_\_\_\_ ENGINEER \_\_\_\_\_

**You are directed to make the following changes in the Contract Documents:**

**Description:** Scope of Change - See Attachment "A"

**Reason for change order:** See Attachment "A"

**Attachments:** (List documents supporting change): Cost and Time Summary, Attachment "B"; and, Supporting documentation, Attachment "C"

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIME
Original Contract Price \$ _____	Original Contract Times Substantial Completion: _____ Ready for final payment: _____ Days or dates
Net changes from previous Change Orders No. ____ to No. ____ \$ _____	Net change from previous Change Orders No. ____ to No. ____ _____ days
Contract Price prior to this Change Order \$ _____	Contract Time prior to this Change Order Substantial Completion: _____ Ready for final payment: _____ Days or dates
Net Increase (decrease) in this Change Order \$ _____	Net Increase in this Change Order _____ days
Contract Price with all approved Change Orders \$ _____	Contract Time with all approved Change Orders Substantial Completion: _____ Ready for final payment: _____ Days or dates

RECOMMENDED BY:

\_\_\_\_\_  
Engineer (Authorized Signature)

APPROVED BY:

\_\_\_\_\_  
Owner (Authorized Signature)

ACCEPTED BY:

\_\_\_\_\_  
Contractor (Authorized Signature)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**ATTACHMENT A**

**[Owner]  
[PROJECT NAME]  
PROJECT No.: XXXXX-XXXXX  
CHANGE ORDER No. 1**

**SCOPE OF CHANGE**

**ITEM**

1.       Description:  
  
Reason:  
  
Change in Cost:   \$0.00  
  
Change in Time:   NN days
2.       Description:  
  
Reason:  
  
Change in Cost:   \$0.00  
  
Change in Time:   NN days
3.       Description:  
  
Reason:  
  
Change in Cost:   \$0.00  
  
Change in Time:   NN days
4.       Description:  
  
Reason:  
  
Change in Cost:   \$0.00  
  
Change in Time:   NN days

**ATTACHMENT B**

**[Owner]**

**[PROJECT NAME]**

**PROJECT No.: XXXXX-XXXXX**

**CHANGE ORDER No. 1**

**COST & TIME SUMMARY**

<u>ITEM</u>	<u>COST</u>	<u>TIME (Days)</u>
1	\$0.00	0 days
2	\$0.00	0 days
3	\$0.00	0 days
4	\$0.00	0 days
Totals	\$0.00	0 days

This Change Order includes not only all direct costs of Contractor such as labor, material, job overhead, and profit markup, but also includes any costs for modifications or changes in sequence of work to be performed, delays, rescheduling, disruptions, extended direct overhead or general overhead, acceleration, material or other escalation which includes wages, and other impact costs.

**ATTACHMENT C**

**[Owner]**

**[PROJECT NAME]**

**PROJECT No.: XXXXX-XXXXX**

**CHANGE ORDER No. 1**

**SUPPORTING DOCUMENTATION**

<b><u>ITEM</u></b>	<b><u>DESCRIPTION</u></b>
--------------------	---------------------------

1	a. b. c.
---	----------------

2	a. b. c.
---	----------------

3	a. b. c.
---	----------------



## Field Order

To: \_\_\_\_\_ *Field Order No.:* \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ *Date:* \_\_\_\_\_  
*Project No.:* \_\_\_\_\_

*Attention:*

*Subject:*

This Field Order is issued to interpret/clarify the Contract Documents, or order minor changes in the work. The work described by this Field Order is to be accomplished without change in Contract Price, Contract Time, and/or claims with other costs.

DESCRIPTION:

ATTACHMENTS:

REFERENCES:

CDM Smith

By: \_\_\_\_\_

Date: \_\_\_\_\_

CONTRACTOR:

By: \_\_\_\_\_

Date: \_\_\_\_\_

cc:

## P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a professional engineer registered in the State of Illinois and that he/she has been employed by

\_\_\_\_\_ to design  
(Name of Contractor)

\_\_\_\_\_  
(Insert P.E. Responsibilities)

in accordance with Section \_\_\_\_\_ for the

\_\_\_\_\_.  
(Name of Project)

The undersigned further certifies that he/she has performed the design of the \_\_\_\_\_

\_\_\_\_\_, that said design is in conformance  
(Name of Project)

with all applicable local, State and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the Illinois EPA within seven days following written request thereof by the Illinois EPA.

\_\_\_\_\_  
P.E. Name

\_\_\_\_\_  
Contractor's Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
Title

PHOTOLOG

SITE NAME: \_\_\_\_\_

CAMERA # \_\_\_\_\_

Photograph #	Description	Date/Time	Photographer



**SUBMITTAL REVIEW** (revised 3-13-12)

<b>TO:</b>  <b>PHONE:</b> <b>FAX:</b> <b>CONTRACTOR PROJECT NO.:</b>	<b>FROM:</b> <input checked="" type="checkbox"/> CDM Smith 125 South Wacker Drive, Suite 600 Chicago, Illinois 60606 <b>PHONE:</b> (312)346-5000 <b>FAX:</b> (312)346-5228 <input type="checkbox"/> CDM Smith FIELD OFFICE  <b>CDM Smith PROJECT NO.:</b>
<b>OWNER:</b> <b>PROJECT:</b> <b>SUBMITTAL NO.:</b> <b>DESCRIPTION:</b>	

<b>TRANSMITTING HEREWITH FOR:</b> <input type="checkbox"/> REVIEW <input type="checkbox"/> CONTRACTOR USE			
<b>QUANTITY:</b> _____ <b>SUBMITTAL NO.:</b> See above <b>DESCRIPTION:</b> See above			
<b>SENT VIA:</b> ____ FedEx Priority _____ FedEx Economy _____ U.S Mail Priority _____ By Hand to Site _____ Courier ____ FedEx Standard _____ U.S Mail Express _____ U.S Mail Regular _____ Email (preferred) _____ Fax			
<b>CRITICAL SUBMITTAL DATES &amp; DEADLINES:</b>	<b>REQUIRED</b>	<b>ACTUAL</b>	<b>NO. OF COPIES</b>
Received by CDM Smith from Contractor			
Comments Due to Contractor			
<b>REQUIRED REVIEW DISCIPLINE: (CHECK ALL THAT APPLY)</b> ____ CIVIL _____ PLUMBING ____ ARCHITECTURAL _____ INSTRUMENTATION ____ STRUCTURAL _____ ELECTRICAL ____ PROCESS/MECH. _____ SOFTWARE ____ HVAC _____ OTHER _____ ____ For O&M Manual Reviews (see especially Div 1 O&M Spec)		<b>PERSONNEL TO PERFORM SUBMITTAL REVIEW:</b> <u>Review Time</u> 1. _____ 2. _____ 3. _____  <small>Reviewer: Please review this submittal form, fill out Comment Sheet as required, complete Shop Drawing Review Stamp, Initial, Date, and return copies as noted to sender (above) by the DATE REQUIRED. NOTE: As much as possible put comments on this and attached reviewer's comment sheet(s).</small>	

<p align="center"><b>OVERALL SHOP DRAWING REVIEW</b> <i>Individual Shop Drawings to each be stamped and Proper Codes indicated</i>  (Stamp does not apply for O&amp;M Manuals)</p> <p align="center"><b>ENGINEER'S REVIEW &amp; RESPONSE REQUIRED OF CONTRACTOR</b></p> <p><input type="checkbox"/> Approved <input type="checkbox"/> Approved as Noted/Confirm <input type="checkbox"/> Not Approved <input type="checkbox"/> Approved as Noted <input type="checkbox"/> Approved as Noted/Resubmit <input type="checkbox"/> Comments Attached <input type="checkbox"/> Receipt Acknowledged (not subject to Engineer's Approval)</p> <p>The Engineer's review of this shop drawing is limited to the review of dimensions, equipment, and materials as presented in the Contract plans, specifications, and for design concept. This review does not relieve the Contractor from errors or omissions in this submittal or from the Contractor's responsibility of addressing any deviations from the Contract Documents. The Contractor is responsible for the details and dimensions of fabrication and manufacture, the means, methods, techniques, sequences, or procedures of construction and performing their work in a safe manner.</p> <p>CDM Smith Inc</p> <p>By _____ Date _____ (See comments for individual responses required.)</p>	<p>This submittal has not been checked for dimensional accuracy. Verification of dimensions is the responsibility of the Contractor.</p> <p align="center"><b>SPECIFIC REVIEW COMMENTS MAY BE FOUND ON ATTACHED PAGES</b></p>
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[illegible]Page 2 of 2

## SUBMITTAL TRACKING LOG

[illegible]



## Work Change Directive Status Log

Project No.: \_\_\_\_\_ Project \_\_\_\_\_  
Contractor \_\_\_\_\_ Owner \_\_\_\_\_

WCD No.	Description	Estimated Amount	Cost Basis	Time	Date Issued	Signed by Owner	Cost Proposal from Contractor	C.O No.	Final Cost

## WORK CHANGE DIRECTIVE

No. \_\_\_\_\_

PROJECT:  
OWNER:  
(Name, Address)

DATE OF ISSUANCE:

CONTRACTOR:

OWNER's Project No.: \_\_\_\_\_

ENGINEER: CDM Smith.

CONTRACT FOR:

ENGINEER's Project No.: \_\_\_\_\_

You are directed to proceed with the following change(s):

Description: \_\_\_\_\_

Purpose of Work Directive Change: \_\_\_\_\_

Attachment(s) (list documents supporting change):

If a claim is made that the above change(s) have affected Contract Price or Contract Time, any claim for a Change Order based thereon will involve one of the following methods of determining the effect of the change(s).

Method of determining change in Contract Price:

☐ Time and Materials

☐ Unit Prices

☐ Cost plus fixed fee

Method of determining change in Contract Time:

☐ Contractor's records

☐ Engineer's records

☐ Other \_\_\_\_\_

Estimated increase (decrease) in Contract Price  
\$\_\_\_\_\_. If the  
increase,  
change involves an increase, the estimated  
amount is not to be exceeded without further  
authorization.

Estimated increase (decrease) in Contract Time  
\_\_\_\_\_ days. If the change involves an  
the estimated time is not to be exceed without  
further authorization.

Once the Work covered by the directive is completed or final cost and time determined, Contractor should submit documentation for inclusion in a Change Order.

**THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR THE CONTRACT TIME. A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.**

RECOMMENDED:

By: \_\_\_\_\_  
Engineer

Date: \_\_\_\_\_

APPROVED:

By: \_\_\_\_\_  
Owner

Date: \_\_\_\_\_